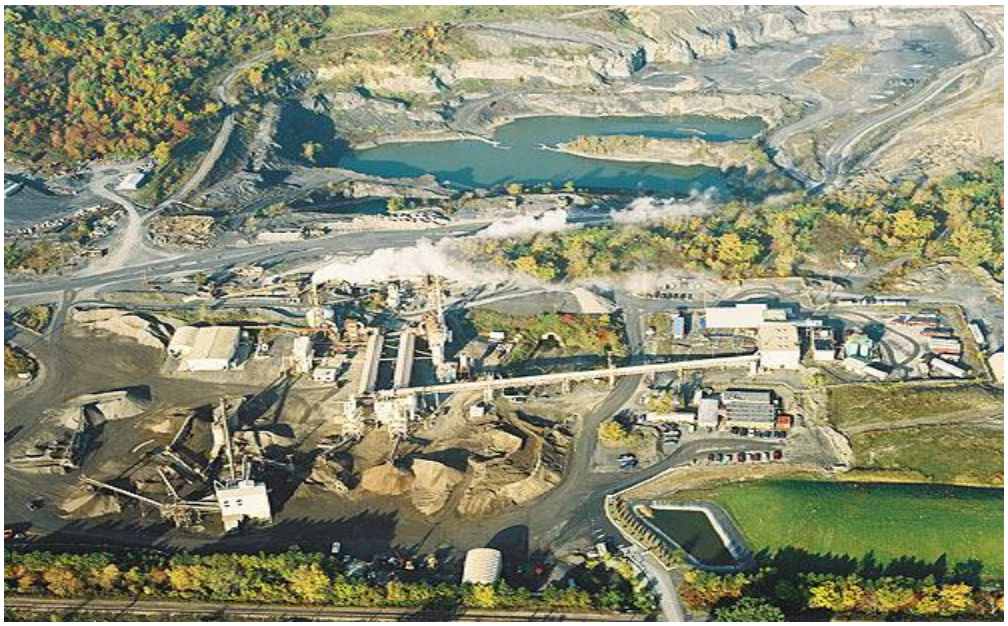
AECOM Environment

Prepared for:
Norlite LLC
628 South Saratoga St.
Cohoes, NY 12047

Prepared by:
AECOM
Chelmsford, MA
60541411-2
August 11, 2017

MACT Comprehensive Performance Test Plan for Lightweight Aggregate Kiln 1

Revision 1 (September 18, 2017)



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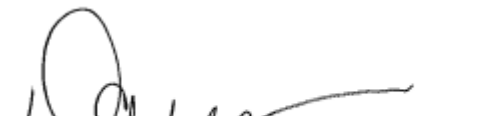
Prepared By: Phaneendra Uppalapati, QSTI, AECOM Project Manager

Reviewed By: Wayne Washburn, QSTI, AECOM Quality Assurance Officer



Reviewed By: Darrell Monk, Plant Manager, Norlite

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List of Acronyms

acfm	actual cubic feet per minute
As	arsenic
APCS	air pollution control system
ASTM	American Society for Testing and Materials
AWFCO	automatic waste feed cut-off
Be	beryllium
Btu	British thermal unit
CAA	Clean Air Act
Cd	cadmium
CEMS	continuous emissions monitoring system
cfh	cubic feet per hour
CFR	Code of Federal Regulations
Cl_2	chlorine gas
CMS	continuous monitoring system
CO	carbon monoxide
CO_2	carbon dioxide
CPT	comprehensive performance test
Cr	chromium
CVAAS	cold vapor atomic absorption spectroscopy
DCS/DAS	distributive control system / data acquisition system
DI	deionized (water)
DOC	documentation of compliance
DOT	Department of Transportation
DQOs	data quality objectives
DRE	destruction and removal efficiency
dscfm	dry standard cubic feet per minute
dscm	dry standard cubic meter
EPA	Environmental Protection Agency (U.S.)
FID	flame ionization detector
FRP	fiberglass-reinforced plastic
FSAP	feed stream analysis plan
GC/MS	gas chromatography/mass spectrometry
gpm	gallons per minute
gr	grains (7,000 grains = 1 pound)
gr/dscf	grains per dry standard cubic foot
g/hr	grams per hour
g/sec	grams per second
HAPs	hazardous air pollutants
HCl	hydrogen chloride (gas) or hydrochloric acid
Hg	mercury
HOCs	hazardous organic constituents
Hr	hour

HRA	hourly rolling average
HRGC/HRMS	high resolution gas chromatography / high resolution mass spectrometry
HWC	hazardous waste combustor
ICAP	inductively coupled argon plasma
ICP-MS	inductively coupled plasma mass spectrometry
ID	induced draft
lb/hr	pounds per hour
LCS	laboratory control sample
LDAR	leak detection and repair
LLGF	liquid low-grade fuel
LSC	laboratory services coordinator
LVM	low volatile metals
LWAK	lightweight aggregate kiln
MACT	maximum achievable control technology
MCB	monochlorobenzene
MDL	method detection limit
mg/kg	milligrams per kilogram
MOC	management of change
MSDS	material safety data sheet
MS/MSD	matrix spike / matrix spike duplicate
MSHA	Mine Safety and Health Administration
MTEC	maximum theoretical emission concentration
NESHAPs	national emissions standards for hazardous air pollutants
ND	non-detect
NDIR	non-dispersive infrared
NIC	notice of intent to comply
NOC	Notification of Compliance
NYSDEC	New York State Department of Environmental Conservation
O&M	operation and maintenance
OPL	operating parameter limit
OTC	operator training and certification
O_2	oxygen
Pb	lead
PCBs	polychlorinated biphenyls
PCDDs	polychlorinated dibenzo-p-dioxins
PCDFs	polychlorinated dibenzofurans
PET	performance evaluation test
pg	picograms
POHC	principal organic hazardous constituent
PHA	process hazard analysis
P&ID	process and instrumentation diagram
PLC	programmable logic control
PM	particulate matter
ppm(v)	part per million (volume basis)

psia	pounds per square inch absolute
psig	pounds per square inch gauge
QAO	quality assurance officer
QAPP	quality assurance project plan
QA/QC	quality assurance/quality control
RA	rolling average
RCRA	Resource Conservation and Recovery Act
RPD	relative percent difference
RRF	relative response factor
RSD	relative standard deviation
scfm	standard cubic feet per minute
S/N	signal-to-noise ratio
SOP	standard operating procedure
SRE	system removal efficiency
SSMP	startup, shutdown and malfunction plan
SVM	semivolatile metals
THC	total hydrocarbons
TEF	toxic equivalency factor
TEQ	toxic equivalencies
tph	tons per hour
VOST	volatile organic sampling train
WAP	waste analysis plan
w.c.	water column

1.0 Introduction

1.1 Facility Overview

Norlite, LLC operates a lightweight aggregate manufacturing complex located in Cohoes, NY. The Norlite facility currently operates two lightweight aggregate kilns (LWAKs) that manage hazardous waste under a RCRA Part B Permit.

General facility information is provided below:

Owner:	Tradebe Environmental Services, LLC
Facility:	Norlite, LLC 628 S. Saratoga Street Cohoes, NY 12047
U.S. EPA ID #.	NYD 080 469 935
Facility Contact:	Mr. Prince Knight Phone No.: (518)-235-0401, Ext 4049 e-mail: prince.knight@tradebe.com

The Norlite LWAKs produce an expanded shale aggregate and in the process burn liquid low-grade fuel (LLGF) as an energy source. The process is monitored and controlled by a distributive control system (DCS) capable of continuously monitoring the process to assure operational parameters are within regulatory and permit limits while waste is being fed to the unit. In addition, both kilns are equipped with a continuous emissions monitoring system (CEMS) that continuously samples the exhaust gases for oxygen and carbon monoxide concentrations in the stack gas stream. This facility handles liquid wastes that are classified as hazardous and also treats process vent streams from operations at the facility pursuant to compliance with 40 CFR Part 63, Subpart DD. Because these units burn RCRA hazardous waste, they are regulated by 40 CFR Part 63, Subpart EEE: National Emission Standards for Hazardous Air Pollutants (NESHAPs) from Hazardous Waste Combustors (HWCs).

1.2 Regulatory Background and Compliance History

With regard to compliance with the maximum achievable control technology (MACT) regulations (Subpart EEE) promulgated on October 12, 2005 (see Section 1.3 below), Norlite has previously completed all preliminary notifications required by this rule. A Notice of Applicability was sent to EPA on April 9, 1999. Notice of a Public Meeting to address both the new MACT rule and the Part B renewal process was posted in the printed and broadcast media over the week of June 19, 1999 time period. The public meeting was held on July 26, 2000 and the final notice of intent to comply (NIC) was submitted to EPA on September 8, 2000. MACT-required compliance testing and notification of compliance (NOC) submittals have been previously conducted as shown in **Table 1-1** below:

Table 1-1 MACT Compliance Testing History

Compliance Test	Kiln Tested	NOC Submittal
Initial Comprehensive Performance Test (CPT) under the Interim Standards	Kiln 2 – March 2004 Kilns 1 & 2 – June 2004 Kiln 1 – July 2004	August 2004
Initial CPT under the Replacement Standards	Kiln 1 – October 2010 & January 2011	April 2011
Initial Confirmatory CPT	Kiln 1 – May 2013	August 2013
Second CPT under Replacement Standards	Kiln 2 – September & October 2015	January 2016

1.3 Applicable MACT Performance Standards

The MACT rule for HWCs promulgated on October 12, 2005, was effective on December 12, 2005 and had a compliance date of October 14, 2008. Norlite fully complies with these regulations after having conducted their initial MACT CPT (pursuant to the Replacement Standards) in October 2010 and January 2011 which successfully demonstrated compliance with all applicable standards and performance criteria. An NOC was submitted to the regulatory agencies in April 2011. Applicable MACT performance standards as noted under 40 CFR 63.1221 are noted in **Table 1-2** below.

Table 1-2 Summary of Applicable MACT Replacement Emission Standards for LWAKs

Emissions Parameter	Limit	Citation
Destruction and Removal Efficiency (DRE)	≥99.99%	40 CFR 63.1221(c)(1)
PCDDs/PCDFs	≤0.20 ng/dscm TEQ	40 CFR 63.1221(a)(1)(i)
Total Chlorine (as HCl & Cl_2)	≤ 600 ppmv dry	40 CFR 63.1221(a)(6)
Mercury	≤ 120 μg/dscm or MTEC in excess of 120 μg/dscm	40 CFR 63.1221(a)(2)
Semivolatile Metals (SVM) (Cadmium and Lead)	≤ 250 μg/dscm and ≤ 3.0E-04 lb per MMBTU heat input*	40 CFR 63.1221(a)(3)
Low Volatile Metals (LVM) (Arsenic, Beryllium and Chromium)	≤ 110 μg/dscm and ≤ 9.5E-05 lb per MMBTU heat input*	40 CFR 63.1221(a)(4)
Carbon monoxide or	≤ 100 ppmv dry	40 CFR 63.1221(a)(5)(i)
Totals Hydrocarbons	≤ 20 ppmv	40 CFR 63.1221(a)(5)(ii)
Particulate Matter (PM)	≤ 0.025 gr/dscf	40 CFR 63.1221(a)(7)

* heat input from hazardous waste
70 FR 59574, October 12, 2005
Note: All emission parameters (except DRE) are measured on a dry basis and corrected to 7% O_2.

1.4 Comprehensive Performance Test Requirements

The requirements for a MACT CPT are outlined under 40 CFR 63.1207(b)(1). Briefly, Norlite is required to:

- Demonstrate compliance with applicable emission standards while the source operates under normal operating conditions; and
- Conduct a performance evaluation of all continuous monitoring systems (CMS) required for demonstration of continuous compliance with the emission standards.

Two other points are worth noting with regard to this "second" CPT to be conducted under the replacement standards at Norlite based on results of the initial CPT conducted in October 2010 and January 2011:

- Since Norlite has previously demonstrated compliance with the DRE standard listed under 40 CFR 63.1221(c)(1) and no changes or modifications have been made to the combustion systems since then, DRE testing is not required as stipulated in 40 CFR 63.1206(b)(7)(A).

- The current set of operating parameter limits (OPLs) established during the initial CPT are effectively waived during this subsequent CPT as noted in 40 CFR 63.1207(h)(1).

The following subsections provide an overview of planned activities.

1.4.1 Regulatory Pathways and Options Selected

The MACT regulations allow for a certain degree of flexibility when choosing the most appropriate means for compliance demonstration. The primary pathways (options) previously chosen by Norlite are listed below:

1) Since the liquid hazardous waste stream fed to the kilns is consistently below 10,000 Btu/lb in heat value, the concentration-based emission standards outlined in 40 CFR 63.1221 apply.

2) Norlite follows the provisions of 40 CFR 63.1209(l)(1)(v) and 40 CFR 63.1209(n)(2)(vii) pursuant to the establishment of metal feed rate limits through the fortification of the waste feed stream with metal constituents and performing an extrapolation. Details on the methodology that has been used during prior MACT tests is summarized in Section 5.5.2.

3) Facilities are allowed to comply with either a carbon monoxide (CO) limit or a total hydrocarbon (THC) limit. Norlite has chosen to comply with the CO limit of 100 ppm corrected to 7% oxygen.

4) A number of the MACT emission standards require an operating limit for maximum flue gas flow rate or maximum production rate to ensure continued compliance. Norlite has chosen to use maximum production rate (shale feed rate) as the controlling parameter for all standards.

5) Facilities with more than one identical combustion device are allowed to conduct testing on a single unit in lieu of testing all regulated units. This is discussed further in Section 1.4.5 below. Data from this campaign will also be used to obtain a formal waiver under 40 CFR 63.7(h).

1.4.2 Other MACT Requirements

There are a variety of other plans and programs that were required to be implemented prior to the MACT compliance date of October 14, 2008. All of these plans/programs were successfully placed in the operating record at Norlite including:

- Startup, Shutdown and Malfunction Plan (SSMP) in accordance with 63.6(e)(3) and 63.1206(c)((2)(ii)(B).
- Operation and Maintenance Plan (O&M Plan) in accordance with 63.1206(c)(7).
- CMS Quality Control (QC) Program Plan as required by 40 CFR 63.8(e).
- Feed Stream Analysis Plan (FSAP) as a replacement for the Resource Conservation and Recovery Act (RCRA) version of a waste analysis plan (WAP); and
- Operator Training and Certification Program (OTC Program) as required by 40 CFR 63.1206(c)(6).

1.4.3 Test Program Overview

This CPT Plan describes how Norlite intends to conduct performance testing for the regulated HWC units at its Cohoes, NY facility. Testing will be conducted to demonstrate that the regulated units continue to comply with all applicable emission standards.

Norlite plans to initiate the performance test during the week of **November 6, 2017**. The testing will be conducted under two (2) sets of operating conditions as described subsequently in Section 2.0. Three (3) sampling runs will be completed for each test condition. The tests to be conducted are summarized below in **Table 1-3**.

Table 1-3 Overview of Stack Test Requirements

Test Parameter	Sampling Method	Analytical Method(s)
PCDDs/PCDFs	EPA Method 0023A	EPA Method 8290A
Mercury	EPA Method 29	EPA Method 7470A
SVM & LVM	EPA Method 29	EPA Method 6020A
Hydrogen Chloride and Chlorine	EPA Method 26A	EPA Method 26A
Particulate Matter	EPA Method 26A	EPA Method 5
O_2 and CO_2	EPA Method 3A (Instrumental Analyzer)	EPA Method 3A
CO and O_2	Facility CEMS	Facility CEMS
Flow and Moisture	EPA Methods 2 & 4	EPA Methods 2 & 4

1.4.4 Comprehensive Performance Test Plan

The requirements for a CPT Plan under MACT are outlined under the General Provisions, 40 CFR 63.7(c)(2)(i), and in 40 CFR 63.1207(f)(1). These requirements are summarized in **Table 1-4** which indicates where the particular item can be found within the body of this document.

Table 1-4 Cross Reference of CPT Requirements

Topic	Regulatory Citation	Section in CPT Plan
Program Summary	40 CFR 63.1207(f) and 63.7(c)(2)(i)	1.0
Data Quality Objectives (DQOs)	40 CFR 63.1207(f) and 63.7(c)(2)(i)	App. A, Sect 3.0
Internal and External Quality Assurance Plan	40 CFR 63.1207(f) and 63.7(c)(2)(i)	App. A, Sect 14.0
Analysis of Feed Streams (as fired)	40 CFR 63.1207(f)(1)(i)	3.0
Identification of HAPs in Feed Streams and Description of Waste handling and blending Operations	40 CFR 63.1207(f)(1)(ii)	3.2
Detailed Engineering Description of Combustor	40 CFR 63.1207(f)(1)(iii)	4.0
Description of Sampling and Monitoring Procedures	40 CFR 63.1207(f)(1)(iv)	6.0 & App. A
Detailed Test Schedule	40 CFR 63.1207(f), (f)(1)(v) and 63.7(c)(2)(i)	5.6
Detailed Test Protocol	40 CFR 63.1207(f)(1)(vi)	5.0
Description of Planned Operating Conditions	40 CFR 63.1207(f)(1)(vii)	5.2
Procedures for Rapidly Stopping Hazardous Waste…	40 CFR 63.1207(f)(1)(viii)	4.2.6 & 4.5.2
Determination of Hazardous Waste Residence Time	40 CFR 63.1207(f)(1)(ix)	4.1.4
Metal Feed Rate Limit Extrapolation (if used)	40 CFR 63.1207(f)(1)(x)	5.5.2
Documentation of Expected Levels of Regulated Constituents in Other Feed Streams that are not Analyzed	40 CFR 63.1207(f)(1)(xi)	3.3.3
Documentation of Conditioning Time Needed to Reach Steady State Operation Prior to Testing	40 CFR 63.1207(f)(1)(xii)	5.4.2
Cement Kilns with in-line Raw Mills…..	40 CFR 63.1207(f)(1)(xiii)	N/A
Cement Kilns with Dual Stacks….	40 CFR 63.1207(f)(1)(xiv)	N/A
Request to use Method 23 for PCDDs/PCDFs	40 CFR 63.1207(f)(1)(xv)	N/A
Documentation of MTEC Levels for HCl/Cl_2	40 CFR 63.1207(f)(1)(xvi)	N/A
Surrogate for Monitoring Gas Flow rate	40 CFR 63.1207(f)(1)(xvii)	1.4.1
Alternative Monitoring Requests under 63.1209(g)(1)	40 CFR 63.1207(f)(1)(xviii)	N/A
Documentation of Temperature Measurement Location	40 CFR 63.1207(f)(1)(xix)	4.1.3
Documentation for Sources Using Carbon Injection	40 CFR 63.1207(f)(1)(xx)	N/A
Documentation for Sources Using Carbon Beds	40 CFR 63.1207(f)(1)(xxi)	N/A
Documentation for Sources Using D/F Inhibitors	40 CFR 63.1207(f)(1)(xxii)	N/A
Sources Performing Manual Sampling for Scrubber Solids	40 CFR 63.1207(f)(1)(xxiii)	N/A
Sources Equipped with Other PM Control Devices	40 CFR 63.1207(f)(1)(xxiv)	N/A
Sources Using Dry Scrubbers for HCl/Cl_2 Control	40 CFR 63.1207(f)(1)(xxv)	2.2.1.11
Handling of non-detect values in waste feed streams…	40 CFR 63.1207(f)(1)(xxvi)	App. A, Sect 3.3 and 13.4.4
Use of Data Compression Techniques for CMS	40 CFR 63.1211(e)	N/A
CMS and CEMS performance evaluation test plan	40 CFR 63.8(e)(4) and 1207(b)(1)	App. B

1.4.5 Notification of Compliance

As noted previously, Norlite plans to initiate the CPT during the week of **November 6, 2017** and submit the NOC within 90 days of completing the test program. Further details on the types of information to be provided in the NOC are given in **Section 7.0**.

1.5 Document Organization

This CPT Plan is organized to provide the information required in 40 CFR 63.1207(f)(2). This section has presented an overview of the facility in terms of regulatory background, compliance history, applicable performance standards, MACT rule integration issues and overview of the planned test program. **Section 2.0** provides a detailed discussion of the operating levels that Kiln 1will operate under to ensure a valid test and certify compliance with the emission standards. **Section 3.0** describes the chemical and physical characteristics for the hazardous liquid and non-hazardous shale feed stream fed to the regulated units. **Section 4.0** provides a technical engineering description of the combustion units and the auxiliary systems, including process monitoring instrumentation. **Section 5.0** describes the test protocols, planned operating conditions and test schedule. **Section 6.0** provides an overview of the waste liquid, shale and stack gas sampling and analysis program and **Section 7.0** provides a discussion of the final report / NOC format for the program. Document appendices include the Quality Assurance Project Plan (**Appendix A**) and the Continuous Monitoring System Performance Evaluation Test Plan (**Appendix B**). Finally, relevant accreditations and/or certifications for the analytical laboratories to be used on this program are provided in **Appendix C**.

2.0 System Operating Parameters

2.1 Operating Parameters Overview

The OPLs currently in place at Norlite are waived for the purposes of conducting all CPTs following the initial CPT as per 40 CFR 63.1207(h)(1). Norlite does intend to establish new limits for all parameters as a result of the November 2017 test. The target limits will match the target limits from Condition 3 of the 2015 CPT performed on Kiln 2 as closely as feasible except for the Liquid to Gas Ratio.

Target operating conditions for the 2017 CPT are provided subsequently in Section 2.3. The OPLs discussed below are based on the provisions of the HWC MACT regulations in 40 CFR 63 Subpart EEE. Most of the parameters result from the operating and monitoring data demonstrated during the CPT. However, several limits are based on regulatory guidance, manufacturer's recommendations and/or good operating practice.

Table 2-1 provides an overview of the specific OPLs required, the applicable regulatory citation and the MACT performance standard with which each specific OPL ensures compliance. **Table 2-2** and **Table 2-3** provide a summary of the limits established during the CPT performed on Kiln 2 in 2015 at Norlite along with the measurement basis and the manner in which the OPL limit will be determined from the test results.

Table 2-1 MACT Operating Parameter Matrix Applicable to LWAKs

Process Parameter	Regulatory Citation	Ensures Compliance with these MACT Performance Standards
Maximum Total (and Pumpable) Hazardous Waste Feed Rate	63.1209(j)(3) and 63.1209(k)(4)	DRE and PCDDs/PCDFs
Minimum Combustion Chamber Temperature	63.1209(j)(1) and 63.1209(k)(2)	DRE and PCDDs/PCDFs
Maximum Production Rate	63.1209(j)(2); 63.1209(k)(3); 63.1209(m)(2); 63.1209(n)(5) and 63.1209(o)(2)	DRE, PCDDs/PCDFs, PM, SVM, LVM and HCl/Cl_2
Liquid to Gas Ratio	63.1209(m)(1)(C) and 63.1209(o)(3)(v)	PM, SVM, LVM and HCl/Cl_2
OPLs that ensure good operation of the waste firing system (i.e., minimum waste feed atomization pressure)	63.1209(j)(4)	DRE
Maximum Heat Exchanger Exit Temperature	63.1209(k)(1)	PCDDs/PCDFs
Maximum Inlet Temperature to a Dry PM Control Device	63.1209(n)(1)	SVM and LVM
PM Control Device Limits	63.1209(n)(3)	SVM and LVM
Wet Scrubber Control Device Limits	63.1209(o)(1), (o)(2) and (o)(3)	PM, Hg, SVM, LVM and HCl/Cl_2
Dry Scrubber Control Device Limits	63.1209(o)(4)	HCl/Cl_2
Maximum Total Mercury Feed Rate	63.1209(l)(1)	Hg
Maximum Total SVM Feed Rate	63.1209(n)(2)	SVM
Maximum Total LVM Feed Rate	63.1209(n)(2)	LVM
Maximum Total Chlorine Feed Rate	63.1209(n)(4) and 63.1209(o)(1)	SVM, LVM and HCl/Cl_2

Table 2-2 Kiln 2 2015 CPT MACT OPLs for the Norlite LWAK Combustion Systems Conditions 1 and 3

Process Parameter	Units	Avg. Period (a)	How Limit Established	Current Limit
Maximum Total (and Pumpable) Hazardous Waste Feed Rate	gpm	1-hr (HRA)	Avg. of **max. HRA** for each run	10.5
Minimum LLGF Feed Atomization Pressure	psig	1-hr (HRA)	Manufacturer's recommendation	56.4
Minimum Kiln Back-end Temperature	°F	1-hr (HRA)	Avg. of the test run averages	866
Maximum Heat Exchanger Exit Temperature	°F	1-hr (HRA)	Avg. of the test run averages	453
Maximum Kiln Production Rate (Shale Feed Rate)	tph	1-hr (HRA)	Avg. of **max. HRA** for each run	23.2
Maximum Total Chlorine Feed Rate	lb/hr	12-hr (RA)	Avg. of the test run averages	84.7
Maximum Total Mercury Feed Rate	lb/hr	12-hr (RA)	Metals Extrapolation	0.010
Maximum Total LVM (As, Be & Cr) Feed Rate	lb/hr	12-hr (RA)	Metals Extrapolation	11.0
Maximum Total Pumpable LVM (As, Be & Cr) Feed Rate	lb/hr	12-hr (RA)	Metals Extrapolation	3.72
Maximum Total SVM (Cd & Pb) Feed Rate	lb/hr	12-hr (RA)	Metals Extrapolation	11.1
Maximum CO concentration corrected to 7% oxygen	ppm	1-hr (HRA)	Regulatory Citation	100

Notes:

(a) HRA = hourly rolling average; RA = rolling average

Table 2-3 Kiln 2 2015 CPT MACT OPLs for the LWAK Air Pollution Control Systems – Condition 3

Process Parameter	Units	Avg. Period (a)	How Limit Established	Current Limit
Maximum Baghouse Inlet Temperature	°F	1-hr (HRA)	Avg. of the test run averages	400
Minimum Venturi Pressure Drop	in. w.c.	1-hr (HRA)	Avg. of the test run averages	2.9
Minimum Scrubber Blowdown Rate	gpm	1-hr (HRA)	Avg. of the test run averages	14.7
Minimum Scrubber Tank Liquid Level	% Ht.	1-hr (HRA)	Avg. of the test run averages	45.3
Minimum Scrubber Recirculation Rate	gpm	1-hr (HRA)	Avg. of the test run averages	173.9
Minimum Scrubber Liquid to Gas Ratio	gal/10^3 ft^3	1-hr (HRA)	Avg. of the test run averages	6.8
Minimum Scrubber Liquid pH	pH units	1-hr (HRA)	Avg. of the test run averages	7.9
Minimum Dry Sorbent Feed Rate	lb/hr	1-hr (HRA)	Avg. of the test run averages	270
Minimum Dry Sorbent Carrier Fluid Flow Rate	cfm	1-hr (HRA)	Avg. of the test run averages	171.6

Notes:

(a) HRA = hourly rolling average

2.2 Establishment of Operating Parameter Limits

The permit limits for each of the control parameters are established as specified in the HWC MACT regulations given in 40 CFR 63.1209. The following sections describe how each control parameter limit is established.

2.2.1 Parameters Demonstrated During the CPT

2.2.1.1 Maximum Total Hazardous Waste Feed Rate [40 CFR 63.1209(j(3) and (k)(4)]

The maximum total hazardous waste feed rate operating limit is established for maintaining compliance with the DRE and dioxin/furan emission standards. Since Norlite feeds only a single hazardous waste liquid stream to the combustor, total hazardous waste feed rate and total pumpable hazardous waste feed rate are the same. The limit is established as an HRA limit from the average of the maximum HRAs demonstrated during the CPT.

2.2.1.2 Maximum Total Metal Feed Rates [40 CFR 63.1209(l)(1) and (n)(2)]

The maximum metal feed rate operating limits are established to maintain compliance with the mercury, SVM and LVM emission standards. Because the waste normally treated in the combustor contains varying levels of native regulated metals, Norlite plans to fortify the LLGF feed tank with metal solutions designed to raise the metal concentrations. The metal feed rate limit for each constituent is then determined by extrapolation using the system removal efficiency (SRE) for each

surrogate metal. The calculated feed rate limit for mercury, LVM and SVM is expressed as a 12-hour RA. The maximum total metal feed rates include the target metals introduced in the shale feed.

2.2.1.3 Maximum Total Pumpable LVM Feed Rate [40 CFR 63.1209(n)(2)(vi)]

A separate limitation on maximum pumpable LVM feed rate will be calculated to include metals introduced by the LLGF.

2.2.1.4 Maximum Total Chlorine Feed Rate [40 CFR 63.1209(n)(4) and (o)(1)]

The maximum total chlorine/chloride feed rate operating limit is established to maintain compliance with the SVM, LVM, and HCl/Cl_2 emission standards. The total feed rate of chlorine/chloride is monitored on a continuous basis by knowing the concentration in the LLGF and shale feed streams. The calculated total chloride feed rate limit is expressed as a 12-hour RA.

2.2.1.5 Minimum Kiln Back-End Temperature [40 CFR 63.1209(j(1) and (k)(2)]

The minimum kiln back-end temperature operating limit is established for maintaining compliance with the DRE and dioxin/furan emission standards. Kiln temperature is monitored on a continuous basis and the limit for the combustor is established as an hourly rolling average (HRA) equal to the average of the test run average values. Though not required for MACT, the maximum back-end temperature will be recorded and reported for RCRA compliance purposes.

2.2.1.6 Maximum Heat Exchanger Exit Temperature [40 CFR 63.1209(k)(1)(ii)]

The maximum heat exchanger exit temperature operating limit is established for maintaining compliance with the dioxin/furan emission standard. The heat exchanger exit temperature is monitored on an HRA basis and the operating limit is established as the average of the test run averages observed during the CPT.

2.2.1.7 Maximum Kiln Production Rate (Shale Feed Rate) [40 CFR 63.1209(j(2), (k)(3), (m)(2), (n)(5), (o)(2)]

The maximum kiln production rate operating limit is established for maintaining compliance with the DRE, dioxin/furan, mercury, PM, and HCl/Cl_2 emission standards. Maximum kiln production rate (shale feed rate) is established as an appropriate surrogate for gas residence time in the combustion chamber and is monitored on an HRA basis. The maximum kiln production rate is established as the average of the maximum HRAs observed during the CPT.

2.2.1.8 Maximum Baghouse Inlet Temperature [40 CFR 63.1209(n)(1)]

The maximum baghouse inlet temperature operating limit is established for maintaining compliance with the SVM and LVM emission standards. The baghouse inlet temperature is monitored on a continuous basis. The maximum baghouse inlet temperature limit for the combustor is established as an HRA equal to the average of the test run averages during the CPT.

2.2.1.9 Minimum Limits for Wet Scrubber Operating Variables [40 CFR 63.1209(o)(1-3)

Minimum operating limits for Norlite's high energy venturi scrubber include pressure drop, blowdown rate, scrubber tank liquid level, recirculation rate, liquid to gas ratio and scrubber liquid pH. These parameters are monitored on a continuous basis to ensure compliance with the PM, mercury, SVM, LVM and HCl/Cl_2 emission standards. The operating limits for each parameter are established as the

average of the test run averages observed during the CPT. Though not required for MACT compliance, the pressure drop across the Ducon scrubber will be recorded and reported for RCRA compliance purposes.

2.2.1.10 Minimum Limits for Dry Scrubber Operating Variables [40 CFR 63.1209(o)(4)

Minimum operating limits for Norlite's dry scrubbing system include dry sorbent feed rate and dry sorbent carrier fluid flow rate. These parameters are monitored on a continuous basis to ensure compliance with the HCl/Cl_2 emission standards. The operating limits for each parameter are established as the average of the test run averages observed during the CPT.

2.2.2 Parameters Established by Regulatory Requirements

2.2.2.1 Maximum Stack Gas CO Concentration [40 CFR 63.1203(b)(5)(i)]

The maximum hourly rolling average stack gas CO concentration will be maintained at or below 100 ppmv corrected to 7% oxygen (dry basis) during the CPT and at all other times when firing hazardous waste.

2.2.3 Parameters Established by Manufacturer's Recommendations, Operational Safety and/or Good Operating Practice

2.2.3.1 Fugitive Emissions Control [40 CFR 63.1206(c)(5)(i)(A), 63.1209(p)]

Norlite's LWAK units are sealed systems operating under negative pressure. Daily inspections are performed to ensure that fugitive emissions do not occur. Corrective actions taken in such an event are fully described in the SSMP developed and placed in the operating record prior to October 14, 2008.

2.2.3.2 Operation of Waste Firing System [40 CFR 63.1209(j)(4)]

This regulation stipulates that facilities should specify operating limits to ensure that good operation of the firing system is maintained to ensure compliance with the DRE standard. To satisfy this requirement, Norlite previously established a minimum waste feed atomization pressure during the initial CPT. The minimum atomization pressure limit for the combustor is established based on the manufacturer's recommendation and as an HRA equal to the average of the test run averages for the CPT.

3.0 Description of Kiln Feed Materials

This section describes the hazardous waste liquid and non-hazardous streams fed to the LWAKs at the Norlite facility. Any hazardous air pollutants (HAPs) listed in Section 112(b) and other non-hazardous constituents expected in these streams are also identified. Storage and delivery of the feed streams to the HWC units are described in **Section 4.0**.

3.1 General Overview

This section provides a description of the primary RCRA hazardous waste streams that are managed within the Norlite facility. Other non-hazardous feed materials are also described.

The waste feed materials handled by the facility cover a wide range of waste codes and hazardous constituents. Because of the potential wide range in materials handled, Norlite does not normally analyze the feed materials for HAPs as defined by Section 112 of the Clean Air Act. However, review of the HAPs list indicates that 50 HAPs could be present in the LLGF material. These compounds are identified in **Table 3-1**. Further information relative to the properties and characteristics of the kiln feed materials processed is provided in the following sections.

3.2 Hazardous Waste Feed Stream

3.2.1 Liquid Low-Grade Fuel

LLGF, which is also Waste Fuel B pursuant to Part 225, is injected countercurrent to the product flow through the kiln through burners at the discharge (front) end of the kiln. A micromotion doppler flow meter is used to continuously monitor the fuel usage rate. LLGF is maintained in nitrogen-blanketed storage tanks and is delivered to the kiln through a pumping station to maintain an approximate maximum feed rate of 10.5 gpm to each burner. The burner consists of a stainless steel outer pipe that supplies atomization air or steam and a 3/8-inch diameter carbon steel inner pipe. This burner uses high-pressure air or steam atomization to inject the material directly into the combustion zone. The LLGF burner is rated at 10.5 gpm at 35 psi line pressure and is monitored continuously. The continuous readings from the micromotion doppler flow meter are connected to the Distributive Control System (DCS) in “control loops” with common wiring, electrical signal transmitters, input/output devices and related programmable logic. All components of each control loop related to the feeding of waste must be operating for the kiln to be enabled to burn waste. The programmable logic controller is designed in such a way that it can sense and verify that various components of the process and the process itself are operating as required. All measured data is conveyed to the Data Acquisition System (DAS) at a frequency of every second using a programmable logic control (PLC).

LLGF consists of organic substances and mixtures immediately useful as fuel. Typical generic types of organic substances that may be present in LLGF at some level at any given time include:

Alcohols	Degreasers
Glycols	Chlorinated Organic Liquids
Polyols	Polymers, Copolymers,

Glycol Ethers	Oligomers and Resin Fragments to include:
Ketones	Epoxies
Esters	Aldehydes
Phenolics	Acrylics
Hydrocarbons	Urethanes
Ethers	Polyethylenes
Oxides & Epoxides	Polypropylenes
Petroleum Oils & Derivatives	Styrenes
Vegetable Oils & Derivatives	Vinyls

Table 3-1 HAPs Potentially Present in LLGF

CAS #	Compound	CAS #	Compound
75058	Acetonitrile	1634044	Methyl tert butyl ether
107131	Acrylonitrile	75092	Methylene chloride (Dichloromethane)
71432	Benzene (including benzene from gasoline)	91203	Naphthalene
117817	Bis(2-ethylhexyl)phthalate (DEHP)	108952	Phenol
56235	Carbon tetrachloride	100425	Styrene
108907	Chlorobenzene	127184	Tetrachloroethylene (Perchloroethylene)
67663	Chloroform	108883	Toluene
1319773	Cresols/Cresylic acid (isomers and mixture)	79005	1,1,2-Trichloroethane
95487	o-Cresol	79016	Trichloroethylene
108394	m-Cresol	108054	Vinyl acetate
106445	p-Cresol	75014	Vinyl chloride
106467	1,4-Dichlorobenzene(p)	1330207	Xylenes (isomers and mixture)
140885	Ethyl acrylate	95476	o-Xylenes
100414	Ethyl benzene	108383	m-Xylenes
107062	Ethylene dichloride (1,2-Dichloroethane)	106423	p-Xylenes
107211	Ethylene glycol	N/A	Antimony Compounds
50000	Formaldehyde	N/A	Arsenic Compounds (inorganic including arsine)
110543	Hexane	N/A	Beryllium Compounds
302012	Hydrazine	N/A	Cadmium Compounds
67561	Methanol	N/A	Chromium Compounds
74873	Methyl chloride (Chloromethane)	N/A	Glycol ethers
71556	Methyl chloroform (1,1,1-Trichloroethane)	N/A	Lead Compounds

78933	Methyl ethyl ketone (2-Butanone)	N/A	Nickel Compounds
108101	Methyl isobutyl ketone (Hexone)	N/A	Polycyclic Organic Matter
80626	Methyl methacrylate	N/A	Selenium Compounds

Note: Data derived from detailed review of waste profile streams, waste analysis data and Norlite industrial chemical survey.

The above list is descriptive and not considered limiting. The substances contained in LLGF are typically those used each day in industry, commerce and around the home. They are found in products such as paints, varnishes, lacquers, thinners, cleaners, detergent formulations, spot removers, nail polish remover, lighter fluid and gasoline. Expected ranges for MACT-regulated parameters in the LLGF are shown in **Table 3-2**. Metal concentrations can exceed the values shown in **Table 3-2**, provided the feed is from agitated tanks and provided that the LLGF feed rate is reduced proportionately to compensate for the higher metals concentration and thereby reduce the net metal feed rate to comply with the mass feed limits in the Sampling and Analysis Plan. Norlite does not use as LLGF any substances or mixtures of polychlorinated biphenyls (PCBs) subject to NYCRR regulations pursuant to Part 371 or Federal PCB regulations pursuant to 40 CFR Part 761. Norlite does not accept waste streams of greater than or equal to 25 ppm total PCBs, and is required to notify NYSDEC of any shipment received with a concentration greater than 10 ppm total PCBs within 24 hours of receipt of analytical results. The contents of streams vary greatly on a daily basis. Typical ranges of analyses for separate LLGF streams are shown in **Table 3-3**. Additional data for hazardous constituents in LLGF are provided in **Table 3-4**.

Table 3-2 Typical LLGF Feed Properties

Parameter	Units	Expected Range
Arsenic	mg/kg	0.5-0.7
Beryllium	mg/kg	< 0.2
Chromium	mg/kg	7.1-52.0
Cadmium	mg/kg	0.5-1.6
Lead	mg/kg	30.8-82.4
Mercury	mg/kg	< 0.04
Heat Content	Btu/lb	3,200-11,000
Density	g/cc	0.88-0.94
Total Chlorine	% wt.	0.04-2.6
Ash Content	% wt.	0.5-2.1

Note: Data derived from detailed review of waste profile streams, waste analysis data and Norlite industrial chemical survey.

Norlite will have two full inside tanks, most likely 100C and 200C, for the 2017 testing. The final composition of the fuel will be determined in the month prior to the test, but will be a mixture of chlorinated and non-chlorinated solvents, industrial oils and emulsions, and tank cleaning material. The target heat content range will be 8,000 to 9,000 Btu/lb with sufficient metals and chlorine content to meet the CPT Plan targets.

Table 3-3 Typical LLGF Analyses for Compound Classes

Compound	Concentration Range, % wt.
Chlorinated solvents (Trichloroethane, Trichloroethene, Tetrachloroethylene, Methylene Chloride, Monochlorobenzene and Tetrachloromethane)	0 – 4%
Alcohols (Methanol, Ethanol, Propanol, Butanol and Isopropyl alcohol)	0 – 20%
Ketones (Methyl Ethyl Ketone, Methyl Isobutyl Ketone, Acetone and Cyclopentanone)	0 – 15%
Aldehydes (Formaldehyde, Butyl Aldehyde and Acetaldehyde)	0 – 0.5%
Petroleum Oils (Fuel oils, Hydraulic oils and Cutting oils)	0 – 25%
Acetates (Ethyl acetate, methyl acetate, Butyl acetate and Vinyl acetate)	0 – 25%
Phenol	0 – 5%
Aromatic Compounds (Benzene, Toluene, Xylenes and Naphthalene)	0 – 25%
Aliphatic Compounds (Hexane, Heptane and Pentane)	0 – 25%
Coal Tars	0 – 25%
Fatty Acids	0 – 5%
Waste Oils	0 – 15%
PCBs **(a)**	< 25 ppm
Organic Halogens	< 5%

Note: Data derived from detailed review of waste profile streams, waste analysis data and Norlite industrial chemical survey.

(a) As stated in Sections 3.2.1 and 3.2.2, the PCB limits of the permit are < 25 ppm, with notification to NYSDEC if the waste fuel received has > 10 ppm total PCBs.

Table 3-4 Representative Data for LLGF Hazardous Constituents

Compound (Common Name)	Formula	Molecular Weight	Heat of Combustion (kcal/g)	Boiling Point (°C)	Fraction of LLGF (% wt.)
Carbon Tetrachloride	CCl_4	153.8	0.24	76.7	<3%
Tetrachloroethylene	C_2Cl_4	165.8	1.19	121.1	<3%
Trichloroethene	C_2HCl_3	131.4	1.74	86.7	<3%
1,1,1-Trichloroethane	CH_3CCl_3	133.4	1.99	74.0	<3%
Monochlorobenzene	C_6H_5Cl	112.56	6.60	132.2	<3%
Formaldehyde	HCHO	30	4.47	-19	<0.5%
Phenol	C_6H_5OH	94.11	7.78	181.7	<5%
Methyl Ethyl Ketone	$CH_3COCH_2CH_3$	72.11	8.07	79.4	<15%
Naphthalene	$ClOH_8$	128.17	9.62	217.8	<25%
Benzene	C_6H_6	78.11	10.03	80.0	<25%
Toluene	$C_6H_5CH_3$	92.14	10.14	110.6	<25%

Note: Data derived from detailed review of waste profile streams, waste analysis data and Norlite industrial chemical survey.

3.3 Non-Hazardous Waste Feed Streams

3.3.1 Solid Feed Materials

The only solid material fed to the kilns is the raw shale from the onsite quarry. No solid waste materials are processed. Shale is proportioned and stored onsite and then fed directly to the kiln. The shale is introduced at the back end of the kiln (countercurrent to the waste fuels that are fed from the opposite end) through a rotary valve in order to prevent fugitive emissions and maintain heat balance in the kiln. The shale travels down the kiln in about thirty (40) minutes while it dries and expands to become the raw clinker. Norlite monitors the feed rate using an 'Accurate dry material feeder model WF1500'. The feed rate is measured by a calibrated scale in weight per hour and recorded using the programmable logic controller system. Data points are collected at a rate of once per minute and are part of the kiln data acquisition network.

Representative analytical data for the shale is provided in **Table 3-5**.

Table 3-5 Typical Shale Properties

Parameter	Units	Expected Range
Arsenic	mg/kg	3.6-13.7
Beryllium	mg/kg	0.6-0.9
Chromium	mg/kg	22.9-47.4
Cadmium	mg/kg	4.3-6.2
Lead	mg/kg	23.4-32.9
Mercury	mg/kg	0.24-0.50
Total Chlorine	% wt.	0.002-0.05

Note: Data derived from detailed review of waste profile streams, waste analysis data and Norlite industrial chemical survey.

3.3.2 Used Oil

Norlite uses non-hazardous waste fuels that can be defined as used oil under 40 CFR 279 and 6 NYCRR 374-2, or Waste Fuel A as defined in 6 NYCRR 225-2. This fuel is used to supplement the hazardous waste LLGF in operating the kilns. Used oil is classified as either specification used oil fuel or off-specification used oil fuel. All used oil fed to the kilns is analyzed as per Norlite's Waste Analysis Plan (WAP) to provide the required information. The data is used to calculate total liquid feed input to the kilns and based on the feed rate which is meter measured as it enters the burn zone. Specification used oil fuel is defined as used oil meeting the criteria listed below in **Table 3-6**.

Table 3-6 Specification Used Oil Fuel Limits

Parameter	Limitation
Arsenic	< 5 ppm
Cadmium	< 2 ppm
Chromium	< 10 ppm
Lead	< 100 ppm
Flash Point	> 100°F
Total Halogens	< 4,000 ppm *
PCBs	< 2 ppm
* any used oil containing greater than 1,000 ppm total halogens is considered a hazardous waste because it is presumed to be mixed with listed hazardous waste. This presumption may be rebutted by demonstrating that the used oil does not contain listed hazardous waste constituents pursuant to 40 CFR 279.10(b)(ii) and 6 NYCRR 374-2.2(a)(i).	

Used oil that does not meet this specification is considered off-specification used oil fuel. Norlite uses specification used oil fuel for start up and shutdown of the kilns and any time the units are not operating under the Part 373 permit parameters (e.g. after an automatic waste feed cutoff or AWFCO). This fuel is considered equivalent to virgin fuel oils and may be used in place of virgin fuels as they are described in the permit. Waste Fuel A is defined under § 225-2 as any waste oil, fuel oil or mixture of these to be burned which contains between 25 and 250 parts per million (by weight) lead and which meets the limitations of Table 2-1 of section 225-2.4 [**see Table 3-7 below**] of this Subpart and does not contain chemical waste. As stated in Section 3.2.1, the PCB limits of the permit are < 25 ppm, with notification to NYSDEC if the waste fuel received has > 10 ppm total PCBs.

Table 3-7 Waste Fuel A Limitations

Constituent / Property	Allowable
PCBs	< 50 ppm *
Total Halogens	1,000 ppm * maximum
Sulfur	See Subpart 225-1 for fuel sulfur limitations
Lead	250 ppm * maximum
Gross Heat Content	125,000 Btu/gal minimum
* parts per million by weight (water free basis) of fuel.	

Off-specification used oil fuel and/or Waste Fuel A are not used during start up or shutdown of the kilns. They are used as the primary supplement to the hazardous waste LLGF when required by the operators. While being co-fired with the LLGF, Norlite ensures that the total metals and chlorine feed rates are not exceeded by the off-specification used oil fuel and/or Waste Fuel A. These fuels may also be used after an AWFCO provided the CO HRA is below 500 ppm.

The used oil flowrate is monitored by a micromotion doppler flow meter in the same manner as the LLGF. The continuous readings from the flow meter are connected to the Distributive Control System

(DCS) in "control loops" with common wiring, electrical signal transmitters, input/output devices and related programmable logic. All components of each control loop related to the feeding of waste must be operating for the kiln to be enabled to burn waste. The programmable logic controller is designed in such a way that it can sense and verify that various components of the process and the process itself are operating as required. All measured data is conveyed to the Data Acquisition System (DAS) at a frequency of every second using a programmable logic control (PLC).

3.3.3 Process Vent Streams

Generally, the vapors fed to the kilns consist of nitrogen gas with trace amounts of organic vapors. It is expected that the vent from the nitrogen-blanketed tanks would be primarily nitrogen with less than 2% by volume organic vapors and less than 10% oxygen. The drum processing vent would be expected to be primarily nitrogen and oxygen with less than 2% by volume organic vapors. These vent streams gases are not monitored as they are in trace quantities. However, the vent lines are monitored with inline four gas meters for safety purposes.

3.3.4 Supplemental Fuels

Natural gas, fuel oils or used oil is used to preheat the kiln during start-up. In cases where fuel oils or used oil is fired with LLGF, the metals content of the fuel oil is taken into account to comply with existing permit limits. Representative data for the fuel oil is summarized in **Table 3-8**. None of the regulated constituents would be expected to be present in natural gas.

Natural gas is also used to maintain the main burner pilot. The pilot flame nozzle is directly below the main fuel nozzle and serves to keep the main burner flame lit. The natural gas input to the kiln during the test is minor will not contribute any measureable hazardous constituents to the system. Natural gas usage is monitored via a thermal mass flow Fluid Components International (FCI) Unit that monitors the gas flow using the thermal dispersion technology using the differential temperature and differential resistance. All measured data is conveyed to the Data Acquisition System (DAS) at a frequency of every second using a programmable logic control (PLC). The thermal input from the natural gas pilot will be presented in the report.

The fuel oil and used oil flow meters are made by Micro Motion Coriolis mass flow meters. Flow is measured on the principle of motion mechanics. The continuous readings from the flow meters are connected to the DCS in "control loops" with common wiring, electrical signal transmitters, input/output devices and related programmable logic. The PLCs are designed in such a way that it can sense and verify that various components of the process and the process are operating as required. All measured data is conveyed to the DAS at a frequency of every second using PLCs.

Table 3-8 Typical Specification for Supplemental Fuel Oil

Parameter	Units	Expected Range
Arsenic	mg/kg	< 0.1
Beryllium	mg/kg	< 0.01
Chromium	mg/kg	< 0.1
Cadmium	mg/kg	< 0.1
Lead	mg/kg	< 1.0
Mercury	mg/kg	< 0.01

Heat Content	Btu/lb	> 16,000
Total Chlorine	mg/kg	< 100
Ash Content	% wt.	< 0.1

Note: Data derived from detailed review of waste profile streams, waste analysis data and Norlite industrial chemical survey.

4.0 Engineering Description of the HWC Units

This section provides a technical, engineering description of the Norlite process and associated combustion systems as well as all associated equipment and ancillary systems. A general description of the LWAK feed streams normally processed is also provided.

4.1 Combustor Design Specifications

4.1.1 General Process Overview

The Norlite facility produces an expanded shale aggregate in two dry process rotary kilns. Raw materials are quarried on-site and transported to the kiln via a conveyor system. The basic material (shale) is proportioned and stored in a silo. The raw product is introduced to the kiln at the feed (back) end from the silo, while fuels are fed from the opposite end. Calcination of the product occurs at a product temperature of 1,700°F to 2,000°F. The shale is then heated to the point of incipient fusion where it is in a semi-plastic state to expand internal gases, thereby creating voids. The cooled vitreous clinker is then discharged and stockpiled.

4.1.2 Rotary Kilns

Kiln No. 1, manufactured by Traylor, is 175 feet long. Kiln No. 2, manufactured by Allis-Chalmers, is 180 feet long. Both kilns have an outside diameter of 11 feet and consist of a steel shell lined with 6-inch refractory brick, for an effective inside diameter of 10 feet. The burn zone extends approximately 30 feet from the burner end of the kiln. The burning zone gas temperature is maintained at 2,200°F to 3,000°F.

The rated capacity of each kiln is approximately 25 tons per hour (tph) clinker. Typically, 2.5×10^6 Btu are required to produce one ton of clinker at maximum capacity. In order to achieve a quality lightweight aggregate product, the kiln is normally operated at approximately 8% to 10% oxygen at the back-end with carbon monoxide concentrations less than 100 ppm.

4.1.3 Location of Combustion Zone Temperature Device

Each kiln has thermocouples mounted at the kiln gas exit and at the fabric filter inlet for monitoring process temperatures.

4.1.4 Hazardous Waste Residence Time

The HWC MACT rule defines hazardous waste residence time as *"the time elapsed from cutoff of the flow of waste into the combustor until solid, liquid and gaseous materials from the hazardous waste exit the combustion chamber."* This is a regulatory term used to define when a unit is operating under a hazardous waste combustion mode. For the purposes of the residence time calculation for Norlite's rotary kilns, this determination is based on the gas-phase residence time since only liquid hazardous waste is burned and since the LLGF would be instantly vaporized in the kiln burning zone where temperatures range from 2,200°F to 3,000°F. The calculation of residence time is based on the kiln dimensions mentioned previously in Section 4.1.2 and actual stack gas flow rate measurements. The longest residence time for each kiln would result from the lowest flue gas flow rate and lowest kiln temperature. These calculations have been based on the flow rate measured by the Method 23

(PCDD/PCDF) sampling train during Condition A of the April 1999 trial burn (41,900 acfm at 140°F). The resulting calculation yields residence times of 4.4 seconds and 4.6 seconds for Kilns 1 and 2, respectively.

4.2 Feed System Descriptions

Heat is supplied to each kiln by firing No's. 2, 4 or 6 fuel oil, used oil, natural gas or LLGF. All fuel is injected countercurrent to the product flow through the kiln through burners at the discharge (front) end of the kiln.

4.2.1 Liquid Waste Feeds

LLGF is maintained in nitrogen blanketed, storage tanks and is delivered to the kiln through a pumping station to maintain an approximate maximum feed rate of 10.3 gallon per minute (gpm) to the burner. The burner consists of a stainless steel outer pipe that supplies atomization air or steam and a $^{3}/_{8}$-inch diameter carbon steel inner pipe. This burner uses high-pressure air or steam atomization to inject the material directly into the combustion zone. The LLGF burner is rated at 10.3 gpm at 35 psi line pressure and is monitored continuously with a Micromotion doppler flow meter.

4.2.2 Solid Feed Materials

The basic feed material is shale, which is proportioned and stored in a covered silo and then fed directly to the kiln. The shale is introduced at the back end of the kiln (countercurrent to the waste fuels that are fed from the opposite end). No solid waste materials are fed to the kiln.

4.2.3 Process Vent Streams

There are two (2) process vent streams that are sent to the kiln for incineration. The first stream is the vent from the nitrogen blanketed LLGF storage tanks. During the filling cycles of the storage tanks, any excess gaseous vapors are vented through a closed vent system to the burner end of the kiln. The second stream consists of vented material from the drum handling operations. Drums are emptied via a vacuum system. The vacuum system vents to the kiln and also includes general drum area vapors under negative ventilation. This vent stream is mixed with ambient air and is used as primary combustion air for the burner.

4.2.4 Supplemental Fuels

Natural gas, fuel oils or used oil are used to preheat the kiln during start-up and may also be used as supplemental fuel while firing LLGF. Natural gas or fuel oil may also be used as a pilot when firing LLGF. Fuel oil or used oil may also be blended with LLGF when firing to increase heat content of the waste feed and improve combustion characteristics. In cases where fuel oil or used oil is fired with LLGF, the metals content of the fuel oil is taken into account in demonstrating compliance with condition VII(C)(6) of the Part 373 Permit.

4.2.5 Waste Handling and Blending Operations

LLGF typically has a flash point of 200°F or lower. The LLGF is not reactive, but may be a toxic waste as defined in 6NYCRR Subpart §371.3(e) because the heavy metal and organic compound concentrations may exceed the limits set forth in that section. Also, LLGF may contain a characteristic corrosive waste though it no longer exhibits the characteristic.

Norlite stores the LLGF in storage tanks or in a container storage area. The tanks and containers are located in a diked area. The design and operation for the tanks and containers are described in Section D, Section F (under Inspection), and Section G -- the Emergency and Contingency Plan. The LLGF, having been pre-screened, is non-corrosive to the glass-lined (Tanks 300-600) or carbon steel (Tanks 100 A,B,C and 200 A,B,C) storage tanks designed with suitable corrosion allowance. The necessary specification for the fuel has been provided to the suppliers, and has been confirmed with their LLGF Specification Sheet, and with the Norlite analysis provided prior to burning and unloading.

When preparing a tank of LLGF for burning, Norlite determines the heating value of the fuel along with the concentration of metals and total halogens. This is accomplished by 1) calculation based upon the original analysis of the fuel that makes up the tank, or 2) sampling and analysis of the tank. Each load of LLGF is sampled and analyzed upon receipt as described in Section C-5(b) of the permit. A control procedure prevents the burning of any waste until the heat content, total halogen, PCB, and metal parameters have been verified. An analysis form (WAP-2) is completed for each tank burned indicating the analyzed or calculated values for each permit parameter, the dates of analysis and/or calculation, and the date of authorization to burn the waste from the designated tank. Once the tank has been blended and certified, it will remain locked until such time that the tank is placed online with the kilns for burning. The tanks are locked with physical pad locks on the bottom and top valves and the recirculation valve. The volume of the tanks is measured using either ultrasonic or radar level gauges. These units do not require routine maintenance and are set based upon the vertical distance from the top of the tank to the bottom. They measure the distance from the top of the tank to the liquid level and calculate the percentage of the vessel that is filled with liquid. They are relatively accurate while the agitators are in operation because the top of the liquid remains fairly level.

4.2.6 Procedures for Rapidly Stopping Hazardous Waste Feed During Equipment Malfunction

Each kiln is manned on an around-the-clock basis by the burner operator from the kiln control room. The burner operator can monitor critical operating variables from the control room via a computerized data acquisition system (DAS). The burner operator in conjunction with the kiln field operator and mechanic make routine system adjustments to maintain the kiln at optimum conditions for the production of light weight aggregate while maintaining the system within the operating window as set forth by the AWFCO system.

In the event that an AWFCO operating parameter has an excursion outside the operating window, LLGF is automatically shut off by the AWFCO system. The burner operator will switch to an alternate fuel such as natural gas or oil until corrections are made to bring the operation within the operating window.

In the event that a non-AWFCO operating parameter has an excursion, the burner operator will attempt to make system corrections to bring the parameter within specification. Should the corrections not bring the parameter within specifications, the excursion will ultimately cause one or multiple AWFCO parameters to trigger the system to operate.

In the event of a power failure, all systems shutdown including, but not limited to, LLGF flow, fuel farm feed systems, raw shale feed, main flame, etc. All systems require manual restart. A virgin fuel is fired to bring all operating parameters within the operating window prior to commencing LLGF feed.

The main flame of the kiln is either self-sustaining or sustained by the presence of a virgin fuel pilot. Both the main flame and the pilot flame are monitored by an electronic eye to provide positive proof

that a flame exists. In the event of a loss of signal by the electronic eye, the virgin fuel feed to the pilot, the main natural gas valve, the LLGF AWFCO valve, and the used oil feed valve are closed and a manual reset is required to re-establish a proof positive flame. Should operating parameters fall outside the operating window during a flame failure, a virgin fuel is fired to bring all operating parameters within the operating window prior to commencing LLGF feed.

4.3 Air Pollution Control System (APCS)

Both kilns have identical emission control systems and include both wet and dry emission control devices for the collection and removal of particulate matter, hydrogen chloride (HCl), metals and other gaseous emission products. The principal collection mechanisms are sedimentation, condensation, impaction, filtration and interception for particulate matter and metals and absorption for HCl and other gaseous species. The overall APCS also includes forced draft fans, an induced draft fan and exhaust stack, each of which is described below. It is also noted that neither kiln is equipped with any type of emergency safety vent.

4.3.1 Multiclone

Kiln emissions first pass through a mechanical collector to remove large particulate matter, a Barrons multiple cyclone unit (multiclone) incorporating relatively small diameter cyclones operating in parallel with a common inlet and outlet. The multiclone is provided to remove coarse particulate matter and is rated for 2-3 in. w.c. pressure drop. Dust collected in the multi-clone accumulates in a hopper. It is air conveyed and combines with the baghouse fines, which are added to the light weight aggregate becoming part of the product.

4.3.2 Heat Exchanger

The kiln flue gas then passes through an air to air heat exchanger rated at 65,000 acfm. This unit was redesigned in late 1999 / early 2000 and now uses two (2) forced draft fans for providing ambient air as the cooling medium. Gases enter the heat exchanger at approximately 900°F to 1,100°F and exit at 400 - 460°F with a 2-3 inch w.c. pressure drop across the unit. The existing fan supplies air to the bottom exchanger shell and a second (new) fan supplies ambient air directly to the top exchanger shell. A damper provides cooling air to control temperature if the inlet temperature to the baghouse is higher than desired. The damper is under negative pressure since it is upstream of the induced draft fan. The damper does not function as an emergency bypass to the air pollution control system. There is no such bypass or "dump stack" in the entire kiln process.

4.3.3 Fabric Filter with Hydrated Lime Addition

Following the heat exchanger is an Aeropulse, Inc. Power Pulse Collector (fabric filter or baghouse) with three modules and 17,334 square feet of filter area. The unit is rated for 52,700 acfm at 450°F. The air cloth ratio is 3.04:1 with all three modules operating and 4.50:1 with one down for maintenance. Teflon impregnated woven fiberglass with a permeability of approximately 10 cfm per square foot at 0.5 in. w.c. is used as the filter media. The filter media is continuously pulsed one row at a time, controlled by a timer. A modulating air damper automatically adjusts inlet gas temperatures (if required) to less than 400°F by bleeding in ambient air directly into the flue gas before entering the baghouse. An automatic waste feed cutoff is activated if baghouse inlet temperature exceeds 400°F, since this is the Part 373 Permit limit. Pressure drop across the unit is rated between 2-10 in. w.c., with all three modules on-line.

Hydrated lime [$Ca(OH)_2$], stored in a 2,500 cubic foot silo, is injected into the air pollution control system immediately prior to the baghouse. This is primarily to control sulfur dioxide and sulfuric acid mist from the combustion of LLGF in the kiln and to protect the baghouse from resulting corrosion. The lime also neutralizes hydrogen chloride, providing approximately 80% of the removal prior to the wet scrubber. The baghouse is designed to control 60% of the SO_2 and SO_3 introduced from the kiln. Lime feed varies from near zero to 1,200 pounds per hour, depending upon the fuel type and feed rate. Typical lime specifications are as follows:

- Calcium oxide – 73.6%
- Surface area – 19,500 cm^2/g
- Mean particle diameter – 1.37 μm
- Bulk density (loose / tamped) – 17.6 / 37.0 lb/ft^3

Fines collected in each cell of the baghouse are discharged via a rotary air lock. The fines are conveyed and combined with the multiclone fines to one of two storage silos. Fines from both silos are added to the light weight aggregate, becoming part of the product. The baghouse is also equipped with a bag leak detection system as required by 40 CFR 63.1206(c)(8)(ii). This system is a BHA Group, Inc. CPM-750 Particulate Detection System that is fully certified to comply with EPA bag leak detection system guidelines of responding to mass emissions at concentrations of 1.0 mg/m^3.

4.3.4 High Energy Venturi Scrubber

The ID fan carries exhaust gases to a BECO Venturi (MMV) high energy wet scrubber for acid gas removal. This unit is rated for 53,000 acfm at 450°F at the inlet and 38,600 acfm at 138°F at the outlet, with 2 to 6 in. w.c. pressure drop. The scrubber is a rod design that has tubular stainless steel rods and baffels installed in rows across the throat. The intent is to provide high turbulence like the effect of a small venturi throat without incurring the high pressure drop typically associated with conventional high efficiency venturi scrubbers. Additionally, the tubes and baffels provide additional impaction surfaces for enhanced particulate and HCl collection. The scrubber is designed for 99% HCl and 68% SO_2 removal efficiencies.

Clean water headers are located directly above the venturi to provide sensible cooling to the exhaust system. Caustic sodium carbonate (soda ash) or sodium hydroxide solution, comprised of a maximum of 10% dissolved solids (sodium carbonate, sodium chloride and/or sodium sulfate), is recycled through the unit at approximately 200 gpm. It is introduced through nozzles located below the water headers and directly above the MMV module. Scrubbing solution is also injected into the transition segment located between the venturi MMV and Ducon units. Excess water drains from the venturi exit elbow to the 1,000-gallon settling/recycle tank. The pH of the solution in the recycle tank is continuously monitored by a pH probe and automatically maintained at pH 7.9 or greater. The pH is adjusted by the introduction of 5% to 10% sodium carbonate or sodium hydroxide solution to the venturi feed at a typical rate of 3 to 25 gpm depending on actual pH readings. Blowdown is taken from the blowdown pump discharge to maintain a constant solids concentration in the solution. Blowdown is typically in the range of 4.4 to 30.0 gpm, depending on the quantity of fuel burned as well as the chloride and sulfur contents.

4.4 Auxiliary Equipment

4.4.1 Ducon Mist Eliminator

Following the BECO MMV unit is a BECO/QUAD MMV mist eliminator installed in the bottom of the Ducon unit. The unit is designed to capture entrained droplets of caustic solution exiting the BECO scrubber. This unit is rated for a pressure drop of 1.5 to 4 in. w.c. This mist eliminator drains into the recycle tank.

A further modification of the Ducon unit consists of two plastic mesh yock mist eliminator pads (or the equivalent) segmented by a baffle controlling velocity across each pad face. This mist eliminator is located at the top of the unit immediately preceding the exhaust stack. Water sprays on the pad flush solids into the unit for capture in the bottom. The Ducon unit functions as an entrainment separator for the venturi scrubber.

4.4.2 Induced and Forced Draft Fans

The baghouse is followed by a Barron 400 HP system fan which induces draft through the kiln, multiclone, heat exchanger and baghouse and provides forced draft on the exhaust gases through the venturi scrubber and Ducon mist elimination units. Additionally, the fan provides induced draft for a hood installed over the kiln shale feed chute, designed and installed to capture any fugitive emissions emanating from this area. The ID fan is rated at 53,000 acfm at 450°F.

Secondary combustion air is supplied by forced draft clinker cooler fans rated at a total of 25,000 scfm. The secondary combustion air is preheated by the clinker cooler at the front end of the kiln. These fans will be monitored during the test.

4.4.3 Exhaust Stack

Scrubbed kiln exhaust passes to the atmosphere via a 48 inch diameter fiberglass-reinforced plastic (FRP) stack 120 feet above grade at approximately 46,000 acfm at 130°F and 15% moisture (v/v). Two access platforms are provided for stack sampling. Sample port configuration and additional details on the exhaust stack are provided in the quality assurance project plan (QAPP) located in **Appendix A**.

4.5 Process Monitoring and Operations

Each kiln is manned on a 24-hr basis by the burner operator. Assisting the burner operator on each shift is one kiln field operator and one mechanic who are responsible for activities outside of the control room and away from the burner floor area. The facility has implemented an OTC Program in accordance with 40 CFR 63.1206(c)(6) and conducts operations in accordance with their O&M Plan as per 40 CFR 63.1206(c)(7). In the event of a power failure, all systems shutdown including, but not limited to, LLGF flow, fuel farm feed systems, raw shale feed, main flame, etc. All systems require a manual reset. In order to restart, the following must take place:

1. Pilot with virgin fuel such as natural gas.

2. Prove positive of flame.

3. Manual restart/reset of system at fuel pumping area at tank farm.

4.5.1 Burner Flame-Out

The kiln is manned around-the-clock by the burner operator who is constantly monitoring operations. Any flame-out is immediately detectable by loss of temperature on the kiln temperature recorder. The temperature within the kiln and the kiln refractory will provide sufficient heat to maintain a burn zone temperature in excess of 2,000°F for at least 5 minutes in the event of loss of flame. In order to restart after this occurrence, the same procedure previously described for a power failure must be utilized.

The main flame of the kiln is either self-sustaining or sustained by the presence of a virgin fuel pilot. Both the main flame and the pilot flame are monitored by an electronic eye to provide positive proof that a flame exists. In the event of a loss of signal by the electronic eye, the virgin fuel feed to the pilot, the main natural gas valve, the LLGF AWFCO valve, and the used oil feed valve are closed and a manual reset is required to re-establish a proof positive flame. Should operating parameters fall outside the operating window during a flame failure, a virgin fuel is fired to bring all operating parameters within the operating window prior to commencing LLGF feed.

4.5.2 Automatic Waste Feed Cut-off System

Kiln process operations are controlled from a central control room by an operator who oversees a computer-based control system. In addition to routine fail-safe features, a series of waste feed cut-offs are programmed into the control system to assure that LLGF is only fed to the kiln under prescribed conditions. This ensures that wastes are properly destroyed and exhaust gases suitably treated before discharge to the environment. Any deviation from prescribed conditions results in immediate interruption, i.e., cut-off, of hazardous waste feed to the kiln. **Table 4-1** provides a detailed listing of all current alarm set points as well as AWFCO limits for the waste feed system to the kiln. For any other non AWFCO operational deviations, the standard operating procedure is to shutdown the LLGF feed, switch to natural gas or fuel oil, define the problem and initiate corrective action. Items such as scrubber or baghouse malfunction, loss of atomizing air/steam, ID fan loss, etc. would be covered by this operating procedure. The loss of the ID fan would warrant the shutdown of the entire process to avoid damage to the APC system. As long as the ID fan runs, however, the kiln is maintained under negative static pressure eliminating the possibility of fugitive emissions.

4.5.3 AWFCO System Testing

Testing of the automatic waste feed cutoff system is conducted in accordance with requirements delineated in 40 CFR 264.347(c) and as outlined in Permit Module V, Section D (Operating Conditions), paragraph (3). Briefly, this consists of monthly testing of the AWFCO system and all associated alarms. Permit requirements also include continuing testing performed on at least one system parameter on a random basis at least once every 7 days to verify proper operation of the control valves. Actual AWFCO events fulfill the weekly testing requirement.

4.5.4 Parameters to be Measured to Ensure Compliance with Standards

As required under the MACT rule, a variety of process parameters must be continuously monitored by the facility's CMS to ensure compliance with the emission standards. A summary of critical process instrumentation and monitoring devices is presented in **Table 4-2**. Under Subpart EEE, Norlite is required to submit a CMS performance evaluation test (PET) plan pursuant to 63.8(e)(4) and 63.1207(b)(1). The CMS PET Plan is included in **Appendix B**.

4.6 Stack Flue Gas Monitoring Equipment

Oxygen, carbon monoxide and flue gas flow rate are monitored continuously at the outlet from the baghouse and recorded digitally in the CEMS and in the kiln computers. A brief description of the stack monitoring instrumentation is provided in **Table 4-3**.

Table 4-1 Current AWFCO Operating Limits

Process Parameter	Units	Basis [a]	Current Alarm Set Point	Current AWFCO Limit
LLGF Feed Rate	gpm	HRA	9.5	> 10.5
Pumpable LLGF Feed Rate	gpm	HRA	9.5	> 10.5
Maximum Shale Feed Rate	tph	HRA	22	> 24
Minimum Back-end Temperature	°F	HRA	876	< 866
CO Concentration at the Baghouse Outlet Corrected to 7% O_2	ppm, dry basis	HRA	90	> 100
Stack Gas Flow Rate	Wet scfm	HRA	32,103	> 33,103
Kiln Pressure, 3 sec delay	in. w.c.	INST	- 0.08	< - 0.05
Kiln Pressure, 1 sec delay	in. w.c.	INST	-0.03	> 0.00
Rear Chamber Pressure	in. w.c.	HRA	-0.11	< -0.08
Rear Chamber Pressure, 1 sec delay	in. w.c.	INST	-0.03	> 0.00
Simultaneous Kiln Pressure & Rear Chamber Pressure	in. w.c.	INST	-0.03	> 0.00
Scrubber Water Recirculation Rate	gpm	HRA	184	< 174
Heat Exchanger Exit Temperature	°F	HRA	443	>453
Maximum Baghouse Inlet Temperature	°F	HRA	390	> 400
Minimum Carrier Flow Rate	cfm	HRA	184	174
Minimum Lime Feed Rate	lb/hr	N/A	280	< 270
Minimum Recirculation Tank pH	pH	HRA	8.2	< 8.0
Minimum Venturi Pressure Drop	in. w.c.	HRA	3.2	< 2.9
Minimum Scrubber Tank Liquid Level	percent	HRA	51	< 46
Scrubber Water Blow Down	gpm	HRA	17	< 14.7
LLGF Atomization Pressure	psig	HRA	62	< 57

[a] HRA = Hourly Rolling Average; INST = Instantaneous

Table 4-2 Process Instrumentation Overview

Process Parameter and Instrument Tag # (Kiln 1 / Kiln 2)	Units	Location	Operating Range
Kiln Back-End Exit Temperature (TT-4303 / TT-2105)	°F	Rear Kiln Hood	866-1,091
Shale Feed Rate (AR-4301 / AR-2401)	tph	Feed Conveyor	0-25
CO concentration (B7-889 & B7-890 / XO7-400 & F6-187) (F-NR.N1-AD-764, 766)	ppm	Baghouse Exit Duct	Automatic: 0-100; 0-300; 0-1,000; 0-3,000
O_2 concentration (B7-066 & B7-067 / AO2-611 & F6-279) (F-NR.N1-AD-765, 767)	%	Baghouse Exit Duct	Automatic: 0-10; 0-15; 0-25
LLGF Feed Rate (MM-4301 / MM-2401)	gpm	Kiln Control Room	0-10.5
Flue Gas Flow Rate K2 (FT-5555) Flue Gas Flow Rate K1 (FT-5566)	wet scfm fps	Exhaust Stack Duct after baghouse	0 – 86,000 0.33 – 131.2
LLGF Atomization Pressure (PT-9104 / PT-2305)	psig	Kiln Control Room	25-80
Sorbent (Lime) Feed Rate (Lime_Feed / Lime_Feed)	lb/hr	Lime Feeder	0 - 500
Sorbent (Lime) Carrier Fluid Flow Rate (Lime_Flow / Lime_Flow)	scfm	Lime Feeder	100 - 300
Heat Exchanger Exit Temperature (TT-4301 / TT-2403)	°F	Heat Exchanger Damper Inlet	350-550
Baghouse Inlet Temperature (TT-4302 / TT-2404)	°F	Heat Exchanger Damper Outlet	350-550
Scrubber Water Recirculation Flow Rate (FT-4403A&B / FT-2507A&B)	gpm	Scrubber Recirculation Line	175-230
Venturi Scrubber Pressure Drop (DPT-4401 / DPT-2303)	in. w.c.	Venturi	5.0-8.0
Ducon Mist Eliminator Pressure Drop (DP_4402 / DP_2508)	in. w.c.	Control Room	0 – 10.0
Kiln Pressure (DPT-5203 / DPT-2104)	in. w.c.	Kiln Front Hood	-2.0 to + 1.0
Scrubber Recirculation Tank pH (4401A&B / 2509A&B)	pH units	Control Room	8.0-11.0
Scrubber Blowdown Rate (FT-1508 / FT-2508)	gpm	Scrubber	4.4-30

Table 4-3 Stack Monitoring Instrumentation

Location	Parameter	Serial No.	Manufacturer	Operating Principle	Ranges
Kiln 1A	O_2 CO	N1-AN 764	Siemens/Ultramat/Oxymat6 Siemens/Ultramat/Oxymat6	Paramagnetic NDIR	0 – 25% 0-200 & 0-3000 ppm(dual)
Kiln 1B	O_2 CO	N1-AN 767	Siemens/Ultramat/Oxymat6 Siemens/Ultramat/Oxymat6	Paramagnetic NDIR	0 – 25% 0-200 & 0-3000 ppm(dual)
Kiln 1 Gas Flow Meter	Stack Flow	40641	Optical Scientific Inc. Model OFS 2000	velocity	0.33 – 131.2 fps
Kiln 2A	O_2 CO	N1-AN 766	Siemens/Ultramat/Oxymat6 Siemens/Ultramat/Oxymat6	Paramagnetic NDIR	0 – 25% 0-200 & 0-3000 ppm(dual)
Kiln 2B	O_2 CO	N1-AN 765	Siemens/Ultramat/Oxymat6 Siemens/Ultramat/Oxymat6	Paramagnetic NDIR	0 – 25% 0-200 & 0-3000 ppm(dual)
Kiln 2 Gas Flow Meter	Stack Flow	247854	Fluid Components International, LLC	Pressure	0 – 86,000 wet scfm

5.0 Test Program Operations

This section provides an overview of test program design, planned kiln operating conditions, planned waste feed requirements, overall sampling strategy and anticipated test schedule.

5.1 Test Program Rationale

This CPT program has been designed to re-establish compliance with all applicable MACT emission standards as previously described in **Table 1-2**. Two (2) LWAK operating conditions are planned for the November 2017 test. The planned operating conditions will be representative of stressed operations at the facility and will be conducted using reasonable worst case waste materials and fuels, including waste fortification for the purposes of establishing appropriate metal feed rate limits as outlined subsequently in this section.

The test will also serve to establish a liquid to gas ratio in order to replace the maximum stack gas flow rate. This will be accomplished by setting the venturi pressure drop using the stack gas flow rate and then adjusting the scrubber recirculation rate as appropriate.

Detailed information on the sampling and analytical methods to be followed for the program along with other information related to the field test program procedures and analytical protocols is provided in **Section 6.0** (Sampling and Analytical Program) and **Appendix A** (Quality Assurance Project Plan).

5.1.1 Demonstrate Compliance with Performance Standards

The test program will feature a comprehensive set of emission measurements to demonstrate compliance with the applicable performance standards listed previously in **Table 1-2**. In addition, testing will be performed to measure certain parameters for the purposes of updating the facility's risk assessment (i.e. additional metals and volatile organics).

5.1.2 Sampling Strategy

The overall testing strategy has been developed to provide the data needed to demonstrate compliance with the applicable MACT emission standards and the additional requirements pursuant to collection of data required to update the risk assessment. Each LWAK is equipped with a stack sampling arrangement consisting of four or more ports at each of two elevations (sampling platforms), with each port oriented at a 90-degree separation from the others. This arrangement is more than sufficient to allow for all planned sampling to be completed concurrently.

The length of each sampling run will be determined by the need to collect sufficient sample volume to obtain adequate detection limits. Expected sample train run times are described more completely in **Section 6.0** (Sampling and Analysis Program) and **Appendix A** (QAPP) of this document.

5.1.3 Dealing with Potential Process Interruptions

If there is a waste feed interruption (i.e., AWFCO) during a sampling run, the following guidelines are suggested and will only be implemented with NYSDEC consultation and concurrence:

- Sampling will be stopped as quickly as possible after the interruption.
- If the interruption is less than 30 minutes, there will be a 15-minute line out period, and then sampling will recommence.
- If the interruption is between 30 and 60 minutes, there will be a 30-minute line out period and then sampling will recommence.
- If the interruption exceeds 60 minutes, there will be a one-hour line out period before testing is resumed.
- If the interruption lasts well in excess of 60 minutes and there is little hope of completing the day's run, then the run will be aborted and begun anew the following day.

5.2 Planned Test Conditions

For this program, two (2) test conditions will be conducted to confirm compliance with the MACT standards. The operating conditions for the test are based on a review of prior operating data, experience operating under the current set of OPLs. The operating conditions described below will be performed in the order listed.

Test Condition 1 will establish new operating limits for LLGF feed rate, shale production rate, kiln back-end temperature and heat exchanger exit temperature. During Condition 1, testing will be performed for PCDDs/PCDFs.

Test Condition 2 will establish new operating limits for shale production rate, baghouse inlet temperature, total metals feed rates, total chlorine feed rate, venturi scrubber pressure drop, liquid to gas ratio, scrubber pH, scrubber flow rate, scrubber blowdown rate, scrubber tank liquid level, dry sorbent feed rate and dry sorbent carrier fluid flow rate. During Condition 2, testing will be performed for metals, PM and HCl/Cl_2.

An overview of planned test conditions along with target operating ranges is provided in **Table 5-1**.

The kiln will be operated under reasonable worst-case conditions to generate higher than normal emissions to demonstrate that even under stressed conditions, the kiln's emissions are below the regulatory limits. Pursuant to 40 CFR 63.1207(g)(1), chlorine content in the LLGF will be normal or higher during the PCDD/PCDF test runs (Test Condition 1). Based on fuel data from calendar year 2016, Norlite will ensure that the chlorine concentration (measured as total halogens) will be approximately 1.0 percent on a weight basis. Ash content will be normal or higher during the semivolatile metal and low volatile metals test runs (Test Condition 2). Based on fuel data from calendar year 2016, Norlite will ensure that the ash concentration will be approximately 1.7 percent on a weight basis. The baghouse pulse cycle will be maintained at its normal rate throughout the particulate matter, semivolatile metals and low volatile metals test runs (Test Condition 2). The chlorine and ash content results will be reported with the fuel analysis in the test report. The baghouse pulse cycle will be included with the operational data in the test report.

5.3 Description, Preparation and Delivery of CPT Feed Materials

To the extent practicable (and with the exception of the added constituents subsequently noted), reasonable worst case materials processed at the facility will be fed to the kiln during the test program. Pumpable waste materials will be stockpiled in appropriate feed tanks to meet the objectives for the

target parameters. All waste materials will be delivered to the kiln in accordance with routine operation and currently permitted procedures as described elsewhere in this document.

Table 5-1 Target Operating Parameters for the 2017 CPT [a]

Process Parameter	Units	Condition 1	Condition 2
LLGF Feed Rate	gpm	10.5	
LLGF Feed Atomization Pressure	psig	56.4	
Shale Feed Rate	tph	23.2	23.2
Total Chlorine Feed Rate	lb/hr		96.8
Total Mercury Feed Rate	lb/hr		0.010
Total LVM Feed Rate	lb/hr		11.0
Total Pumpable LVM Feed Rate	lb/hr		3.72
Total SVM Feed Rate	lb/hr		11.1
Minimum Kiln Back-End Temperature	°F	866	
Heat Exchanger Exit Temperature	°F	453	
Baghouse Inlet Temperature	°F		400
Venturi Pressure Drop	in. w.c.		2.9
Scrubber Blowdown Rate	gpm		14.7
Scrubber Tank Liquid Level	% Ht.		45.3
Scrubber Recirculation Rate	gpm		174
Scrubber Liquid to Gas Ratio	$gal/10^{-3}\ ft^3$		5.0
Scrubber Liquid pH	pH units		7.9
Dry Sorbent Feed Rate	lb/hr		270
Dry Sorbent Carrier Fluid Flow Rate	cfm		174
CO concentration corrected to 7% O_2	ppm	100	100

[a] Values listed are targets and may vary by ± 20% during actual testing. Note that values are only listed for the condition during which they will be re-established.

5.4 Test Materials and Quantities

5.4.1 Quantity of Hazardous Waste to be Burned

The quantity of hazardous waste (LLGF) to be burned during this program is based on the target feed rate specified in **Table 5-1**. Assuming about 14 hours of waste burning over each day, and the planned schedule outlined later in this section, it is estimated that about 26,000 gallons of LLGF would be burned during the test program.

5.4.2 Time to Achieve Steady-State Operation

The time required to reach steady-state operation is governed primarily by the time to establish acceptable rolling averages for the applicable process parameters. HRAs for all applicable parameters will be established at or near their desired values prior to test initiation. One-hour of steady state operation will be required to establish desired HRAs prior to test initiation. If emission sampling has to be interrupted during the middle of a run, the one-minute averages during the

interruptions will not be used for the calculations of HRAs following the interruption. The last HRA considered will be concurrent with the end of the test run sampling period.

5.5 Waste Feed Fortification

5.5.1 Metals Constituent Additions

In order to demonstrate the required performance criteria for metals control, it will be necessary to fortify (augment) the LWAK fuel (LLGF) with inorganic constituents. This section describes the selected constituents and relevant parameters pertaining to waste feed fortification.

5.5.1.1 Waste Feed Strategy

Norlite intends to fortify the LLGF with several metal constituents for the purposes of establishing desired metal feed rates and demonstrating satisfactory metals removal from the system. Norlite plans to add solutions of metal acetates to the LLGF feed tanks (if necessary) to achieve the desired feed concentrations.

Norlite plans to use cadmium acetate, chromic acetate and mercuric acetate to fortify the LLGF used in the test. These organometallic compounds were chosen due to their solubility in alcohol which is a major component of the LLGF.

5.5.1.2 Metal Feed Rate Extrapolation

The goal for the CPT will be to establish feed rate limits for metals consistent with current permit levels. These limits were derived through extrapolation of the actual metal quantities fed. A similar approach will be followed for the CPT data. The ultimate objective will be to use the SREs demonstrated during the CPT for mercury, chromium (representing the LVM group) and cadmium (representing the SVM group) to arrive at feed rate limits that meet the appropriate emission standard.

Justification for the selection of surrogate metals comes from the MACT rule itself and has been supported in EPA Regions 4 and 5. In the MACT preamble (pg 52946), EPA provides discussion on the issue of metal surrogates and states in the 3rd column, 2nd paragraph that “For example, you may use chromium as a surrogate during the performance test for all low volatile metals. Similarly, you may use lead as a surrogate for cadmium, the other semivolatile metal. This is because the metals within a volatility group have generally the same volatility.” (EPA also goes on to say that you could also use one SVM as a surrogate for any LVM because SVM will be more difficult to control.)

As stated above, it is expected that any metals added to the LLGF feed tank will be in the form of metal acetates. An example calculation relating to extrapolation for the LVM group follows. Norlite will use the feed rate of chromium in conjunction with the chromium emission rate to establish a SRE. That SRE would then be used to establish a feed rate limit for LVM that ensured compliance with the standard. For example, if chromium were fed at 4.0 lb/hr total (pumpable LLGF plus shale) and a SRE of 99.99% resulted, an extrapolated feed rate limit of 60 lb/hr would result. This feed rate would represent the limit for arsenic, beryllium and chromium combined. These calculations also show that the minimum SRE needed to comply with the MACT LVM standard of 110 $\mu g/m^3$ is 99.85%. Norlite will set significantly lower actual feedrates in the NOC and CPT Report. These calculations as well as similar computations for the SVM group are illustrated in **Table 5-2**.

Table 5-2 Metals Extrapolation – Example Calculations

Parameter	LVM	SVM
Surrogate Metal	Chromium	Cadmium
Assumed CPT Feed Rate, lb/hr	4.0	4.0
Demonstrated SRE, %	99.990%	99.990%
MACT standard, µg/m³	110	250
Assumed Stack Flow rate, dscfm	33,800	33,800
Assumed Stack Oxygen, %	15.0	15.0
Extrapolated Feed Rate Limit at MACT Standard, lb/hr	60	136
Minimum Required SRE to meet MACT Standard, %	99.8508%	99.6609%

5.6 Test Schedule

This section summarizes the anticipated schedule for test program implementation. **Table 5-3** provides a detailed schedule associated with the day-to-day activities of the CPT field program. This schedule includes days for arrival, safety orientation and testing and assumes that testing will be conducted over the course of three days (one condition completed per day).

Given that testing is planned for several long days, during the test setup day, Norlite, NYSDEC and the AECOM field team leader will develop a consensus regarding the latest time that a run will be started for the planned test day.

Table 5-3 Detailed CPT Field Schedule

General Overview of Planned Schedule

Activity	Schedule (2017)
Arrival onsite, site safety training and equipment set-up. Also conduct preliminary stack measurements.	Monday, November 6
Test Condition 1, Runs C1-R1 and C1-R2	Tuesday, November 7
Test Condition 1, Run C1-R3	Wednesday, November 8
Test Condition 2, Runs C2-R1, C2-R2 and C2-R3	Thursday, November 9
Ship samples. Pack equipment and depart site.	Friday, November 10

Example of Detailed Daily Schedule – Test Day 1 Above

Test Activity	Time
Kiln 1 lined out on CPT waste	Overnight
CEMS daily calibrations conducted	06:00 – 07:00
All operating conditions and associated hourly rolling averages at or near their target values.	07:00
Begin Run 1 for PCDDs/PCDFs	08:00
Complete Run 1 for PCDDs/PCDFs	11:15
Begin Run 2 for PCDDs/PCDFs	12:00
Complete Run 2 for PCDDs/PCDFs	15:15
Complete sample train recoveries	15:45 – 17:45

Example of Detailed Daily Schedule – Test Day 2 Above

Test Activity	Time
Kiln 1 lined out on CPT waste	Overnight
CEMS daily calibrations conducted	06:00 – 07:00
All operating conditions and associated hourly rolling averages at or near their target values.	07:00
Begin Run 3 for PCDDs/PCDFs	08:00
Complete Run 3 for PCDDs/PCDFs	11:15
Complete sample train recoveries	12:45 – 14:45

Example of Detailed Daily Schedule – Test Day 3 Above

Test Activity	Time
Kiln 1 lined out on CPT waste	Overnight
CEMS daily calibrations conducted	06:00 – 07:00
All operating conditions and associated hourly rolling averages at or near their target values.	07:00
Begin Run 1 for Hg, SVM, LVM, PM and HCl/Cl_2	08:00
Complete Run 1 for Hg, SVM, LVM, PM and HCl/Cl_2	10:00
Begin Run 2 for Hg, SVM, LVM, PM and HCl/Cl_2	10:30
Complete Run 2 for Hg, SVM, LVM, PM and HCl/Cl_2	12:30
Begin Run 3 for Hg, SVM, LVM, PM and HCl/Cl_2	13:00
Complete Run 3 for Hg, SVM, LVM, PM and HCl/Cl_2	15:00
Complete sample train recoveries	15:15 – 17:15

6.0 Sampling and Analysis Program Overview

This section presents a summary of the sampling and analysis program for this project. Further details on the overall sampling and analysis program are found in the QAPP for this project, located in Appendix A. As noted in previous sections of this document, the test program will consist of two test conditions consisting of three (3) sampling runs each.

6.1 Liquid Waste Sampling and Analysis

The LWAKs burn a single liquid hazardous waste feed stream that will be sampled prior to being fed to the kiln in accordance with acceptable protocols. A sampling tap in the feed line is available for this purpose. The LLGF will be sampled every 15 minutes during each run, composited and analyzed for the parameters listed in **Table 6-1**.

Facility personnel will collect these samples under AECOM's direction using pre-cleaned sample bottles suitable for the type of sample being collected and the intended analysis. AECOM will provide all sample containers and assume custody of the samples at the end of each day. Prior to initiating field testing activities, AECOM will hold a training session with facility staff responsible for sample collection to review grab sampling techniques, size of sample aliquots, compositing procedures and sample bottles to be used. Agency personnel who will be providing testing oversight are invited to attend this training session.

6.2 Used Oil Sampling and Analysis

It is not anticipated that used oil will be fed to the kiln during the test. However, should this not be the case, used oil will be sampled at the same frequency and analyzed for the same parameters as the LLGF.

6.3 Shale Sampling and Analysis

Raw shale fed to the kiln will be sampled at the beginning, middle and end of each run from the conveyor belt using a scoop with an appropriate aliquot being emptied into the final collection bottle. Shale will be analyzed using the methods and procedures identified in **Table 6-1**.

Table 6-1 Sampling and Analytical Summary for LLGF and Shale

Analytical Parameter	LLGF	Shale
Total Chlorine	EPA M 5050 (Prep) EPA M 9253 (Silver Nitrate Titration)	EPA M 5050 (Prep) EPA M 9056A (IC)
Mercury	EPA M 7471B	EPA M 7471B
Other Metals	EPA M 3051 (Prep) EPA M 6010C	EPA M 3051 (Prep) EPA M 6010C
Sediment	ASTM D 1796 (Norlite SOP # 04-049)	Not Applicable
Ash Content	ASTM D 482-02	Not Applicable
Density	Gravimetric (Norlite SOP # 04-012)	Not Applicable
Heat Content	ASTM D 240-02	Not Applicable

6.4 Stack Gas Sampling and Analysis

The exhaust stack will be sampled for the parameters summarized below in **Table 6-2**. These include: flue gas velocity, flow rate, temperature, moisture content and fixed gas (O_2 and CO_2) composition; PCDDs/PCDFs; metals; HCl / Cl_2; particulate matter; and carbon monoxide (CO).

Table 6-2 Sampling and Analytical Summary for Exhaust Gas Stream

Stream Sampled / Sampling Frequency	Test Parameter	Sampling Method	Analytical Method(s)
Stack Flue Gas			
3-hr run / 3 runs total	PCDDs/PCDFs	EPA Method 0023A	EPA Method 8290A
3-hr run / 6 runs total	O_2 and CO_2	EPA Method 3A	EPA Method 3A
2-hr run / 3 runs total	Mercury	EPA Method 29	EPA Method 7470A
2-hr run / 3 runs total	LVM and SVM	EPA Method 29	EPA Method 6020A
2-hr run / 3 runs total	Particulate Matter	EPA Method 26A	EPA Method 5
2-hr run / 3 runs total	HCl and Cl_2	EPA Method 26A	EPA Method 26A
Facility CEM / 6 runs total	CO, O_2 & gas flow rate	Facility CEM QA Plan	Facility CEM QA Plan

Stack gas emission samples will be collected from test ports that meet the minimum criteria specified in EPA Method 1. One test port level with 4 isokinetic sampling ports is available to accommodate testing of all emissions test parameters. Further details on the stack configuration, field data sheets, isokinetic sampling train setup and recovery and program QA/QC are provided in the QAPP for this project (**Appendix A**).

Gas stream flow rate and moisture will be determined during each test run in conjunction with each isokinetic sampling train. Gas stream velocity will be determined using a pitot tube and water manometer in accordance with EPA Method 2. Gas stream temperature will also be determined at each of the Method 2 traverse points using a Type K thermocouple and pyrometer. Gas stream moisture will be determined as specified in EPA Method 4 concurrent with each isokinetic sampling

method. In this procedure the impinger contents are measured for volume or weighed before and after each test run and used in conjunction with the metered gas volume to determine the gas stream moisture content.

7.0 Final Data Reporting

The final report for this project will be a comprehensive data compilation that properly and logically documents and certifies all required test results. The report will include all of the required elements of a MACT NOC as outlined in **Table 7-1** below.

Table 7-1 Types of Information to be Presented in Norlite's NOC

Facility Information
Facility Name and Location: Norlite LLC, Cohoes, NY 12047
Contact: Prince Knight –(518)- 235-0401, Ext 4049 – prince.knight@tradebe.com
Source Information
Title V Classification: Major Source
Affected Sources: Lightweight Aggregate Kilns 1 and 2
Air Pollution Control: Multiclone, fabric filter and venturi scrubber on each unit
Applicability
The kilns are regulated under 40 CFR Part 63 Subpart EEE (HWC MACT) as lightweight aggregate kilns
Emission Standards
The applicable emission standards (listed in **Table 1-1** of this CPT Plan) for the Norlite facility are based on the limits outlined at 40 CFR 63.1221 for lightweight aggregate kilns. All emission standards (except DRE) are corrected to 7% oxygen.
Compliance Demonstrations
Once the CPT has been completed, Norlite will summarize the test results and show that all emission standards were met and that all operating limits were satisfied.
Certification
Norlite LLC hereby certifies that: All required CEMS and CMS are installed, calibrated and continuously operating in compliance with the requirements of Subpart EEE; Based on the results of the CPT conducted in November 2017, the LWAKs are operating in compliance with the emission standards and operating requirements of 40 CFR Part 63 Subpart EEE; and The OPLs required by 40 CFR 63.1209 and previously established ensure compliance with the standards.
Signature:
Name:
Title: **Date:**

AECOM plans to follow the generic guidance provided by EPA for a combined NOC and CPT report and, as such, the report would be structured in a similar manner with sections delineated as follows:

- Summary of Test Results and Comparison to MACT Standards
- Report Certification
- Introduction and Overview of Process Description
- Process Operating Conditions During the CPT
- Kiln Feed Stream and Stack Sampling Test Results
- Quality Assurance / Quality Control Documentation

Report appendices will also provide detailed supporting documentation and would include:

- Process Operating Data
- Field Data Sheets and Sampling Documentation
- Analytical Data Reports
- CMS / CEMS performance Evaluation Test Evaluation Results

Further details on data reporting are provided in Section 13.0 of the QAPP (Appendix A).

8.0 Health and Safety

8.1 Plant Access and Sampling Location Access

Visitors at Norlite are required to sign at the entry gate and will go through a site specific orientation. Non office visitors are expected to have basic personal protective equipment (PPE) eye protection, safety footwear, head protection, hand protection, and hearing protection for site walks. Visitors will be escorted during their visit to designated work areas and visitors are not allowed to wander to undesignated areas. Visitors that require facility walk downs will be escorted during the entire duration of the visit.

8.2 Sampling Location Safety

8.2.1 Field Safety Responsibilities

A Safe Work Plan (SWP) will be developed by AECOM Project Manager in collaboration with Regional Health and Safety Manager before the start of the test program identifying potential hazards, emergency procedures, roles and responsibilities, required training and task hazard assessment

The AECOM PM is, by designation, the individual who has the primary responsibility for ensuring the health and safety of AECOM employees during this test program. AECOM Project Team Lead on site is responsible for the implementation of safety procedures in the field. Field Team Lead will ensure that that field staff has necessary PPE not limiting to eye protection, safety footwear, head protection, hearing protection, hand protection and fall protection equipment.

Access to sampling location is through a fixed caged ladder and the sampling platform is a Mine Safety and Health Administration (MSHA) approved platform. AECOM sampling equipment required will be hoisted with a rope and pulley setup to the sampling levels. Necessary precautions will be taken by barricading the drop area under the sampling platform with caution tape.

Safety concerns that may arise before or during the sampling process will be accessed and mitigated using hierarchy of controls before the work is resumed.

Appendix A

Quality Assurance Project Plan (QAPP)

Quality Assurance Project Plan (QAPP)

MACT CPT Program for the Norlite LWAK No. 1

This document presents the Quality Assurance and Quality Control goals, objectives, and procedures for the Norlite comprehensive performance test (CPT) program to be conducted in **November 2017**. The quality assurance/quality control procedures and criteria for this program will comply with the requirements of this document and any updates. The analytical work conducted will incorporate the QA/QC requirements of the approved methods. This document has been prepared using available guidance provided in the following documents:

- Louisiana DEQ – Regulatory Burn Plan Recommendations: "Example Outline for Combined RCRA and MACT Test Burn Plan", April 2007
- "Component 2 - How to Review a Quality Assurance Project Plan (including Attachment A - Generic Trial Burn QAPP", Hazardous Waste Combustion Unit Permitting Manual, U.S. EPA Region 6, January 1998.
- "Handbook – Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration" (EPA/625/6-89/023 January 1990).

Facility ID Number: NYD 080 469 935

Prepared for: Norlite LLC, Cohoes, NY

Prepared by: AECOM, Inc., Chelmsford, MA 01824

Revision No.: 1

Date of Rev 1 Submittal: Septemeber 18, 2017

Expected Test Date: November 06, 2017

Project Approvals

_____	August 11, 2017
Mr. Darrell Monk, Norlite Plant Manager	Date
Wayne W. Washburn	
_____	August 11, 2017
Mr. Wayne Washburn, QSTI AECOM QA Officer	Date
V. Phani	
_____	August 11, 2017
Mr. Phani Uppalapati, QSTI AECOM Project Manager	Date
_____	_____
Ms. Tara Daniels, Adirondack Laboratory Coordinator	Date
_____	_____
Mr. Kevin Woodcock, TestAmerica Laboratory Coordinator	Date
_____	_____
Ms. Martha Maier, Vista Analytical Laboratory Coordinator	Date

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1.0 Project Description

This project will consist of a comprehensive sampling and analysis program designed to re-certify compliance with all applicable MACT (Subpart EEE) performance standards on Kiln 1. Testing will be performed under two (2) operating conditions comprised of three (3) sampling runs each. The reader is referred to other sections of the overall CPT Plan for further details on program scope, test objectives and target parameters for emission measurements and process monitoring. The remainder of this QAPP outlines the detailed measures that will be followed to ensure collection of valid data.

2.0 Project Organization

AECOM will be responsible for overall management of this MACT CPT program. The AECOM Project Manager, Mr. Phani Uppalapati, will provide overall direction of the program and will report to the Norlite Project Manager, Mr. Prince Knight. As project manager, Mr. Uppalapati will be responsible for project design and implementation, communicating with the client and scheduling all activities.

2.1 Facility Owner / Operator: Norlite, LLC

Mr. Prince Knight is the Environmental Manager at Norlite and is the Norlite project manager for the CPT program. Mr. Knight will be responsible for coordinating Norlite's efforts during the program and will be the principal point of contact during implementation of the field test program. Mr. Knight will be assisted by Operations in waste feed stream sampling and process data retrieval.

2.2 AECOM QA Officer

Mr. Wayne Washburn will serve as the project Quality Assurance Officer (QAO) and will be responsible for review and approval of this QAPP, as well as any subsequent revisions. He will monitor implementation of field and laboratory activities and schedule performance and/or system audits as discussed later in Section 9.0. The QAO will report on any conditions noted which may adversely affect data quality.

Mr. Washburn and Mr. Uppalapati will provide oversight of the AECOM field measurement team functions including field sampling, data verification and data quality assessment activities and will prepare a section of the Final Report summarizing QA/QC activities and providing an overall evaluation of data quality.

2.3 Regulatory Oversight

The New York State Department of Environmental Conservation (NYSDEC) and EPA Region 2 will be the primary Agencies involved in review and approval of this QAPP.

AECOM will obtain commercially available audit samples for Method 26A and Method 29 from accredited audit sample provider Environmental Resource Associates located in Golden, CO for the measurement program. The test consists of blind audit samples provided by the accredited audit sample provider is evaluated during the performance test program and analyzed by the same laboratory following the same procedures as the compliance samples. Per the audit program, the results of these audits will be supplied to the NYSDEC.

2.4 Laboratory Services Coordinators

Each analytical laboratory to be used on the program will designate a laboratory services coordinator (LSC), who will be the principal point of contact for the AECOM Management Team. The LSC will review QA requirements with all laboratory staff to ensure that all required measures are taken to meet data quality objectives. They will monitor the shipment and receipt of samples, track analytical progress and review data as reported from the laboratories for completeness. Mr. Kevin Woodcock will serve as the LSC for TestAmerica Laboratories. Ms. Martha Maier will serve as the LSC for Vista Analytical Laboratories. Ms. Tara Daniels will serve as the LSC for Adirondack Environmental Services. Each LSC will be responsible for validation of all

data generated by the laboratory for this program and will provide all necessary documentation for inclusion in the final report.

3.0 Data Quality Objectives

This section provides a general overview of the data quality objectives (DQOs) for this test program. Specific DQOs for each individual sampling train and/or each analytical methodology performed by the subcontractor laboratories are provided later in Section 7.0 of this QAPP.

3.1 Precision, Accuracy and Completeness

The collection of data to fully characterize the LWAK waste feed material and stack gas emissions requires that sampling and analysis procedures be conducted with properly operated and calibrated equipment by trained personnel. The overall program has been designed with consideration of sampling parameters and analytical limits to ensure that the achieved method-specific detection limits for measured emissions will be more than adequate for demonstrating compliance with the MACT emission standards and performance criteria. **Table 3-1** provides a summary of the overall precision, accuracy and completeness objectives for the program.

Precision is defined as a measurement of mutual agreement among individual measurements made under prescribed similar conditions. Precision is expressed in terms of relative percent difference (RPD) between duplicate determinations and in terms of relative standard deviation (RSD) when 3 or more determinations are made. Overall precision for analysis of the waste feed streams will be assessed through the analysis of one set of duplicate samples for each designated parameter.

Accuracy is the degree of agreement of a measurement with an accepted reference or true value. Analytical accuracy will be measured through the recoveries of surrogate spikes, matrix spikes, analysis of standard reference materials or audit sample analysis. Surrogates are compounds added to samples submitted for organic analyses prior to extraction and analysis; their recoveries are measured to assess sample-specific analytical efficiency and accuracy. Matrix spike (MS) samples for the waste feed will be prepared by spiking known amounts of target analytes into a portion of the sample. Matrix spike samples for the stack organic analyses will be prepared by spiking known amounts of target analytes into the sampling media and then carrying the spiked sample through the entire preparation and analysis sequence. Recoveries are monitored to assess laboratory and method accuracy. LCS will also be used to distinguish between method performance and matrix effects on accuracy. LCS and MS solutions will be independent from calibration standards.

Completeness is a measure of the amount of valid data obtained compared to the amount that was expected under normal conditions. The overall program objective is to obtain valid data for three (3) runs for each test condition. For all data considered critical to the investigation, a completeness objective of 100% has been established. As a result, critical priority data from each set of three (3) runs should achieve the precision and accuracy goals established herein. This completeness criterion applies to all permit parameters in emissions samples as well as any feed/process stream samples. Individual samples for which the critical data points do not achieve accuracy and/or precision data quality objectives may require reanalysis. Results for samples where matrix interferences preclude meeting objectives for the recoveries of surrogates or spikes will be evaluated for potential bias to calculated emission results. In summary, the completeness goals are stated at 100%, since a minimum of three valid runs is necessary to assess operation at each test condition.

Table 3-1 Precision, Accuracy and Completeness Objectives

Stream Sampled / Sampling Method	Parameter	Sampling Precision (RPD)	Analytical Precision (RPD)	Analytical Accuracy (%)	Completeness (%)
Kiln Feed Materials					
Grab / Composite	Ash Content	< 50	< 35	75 -125	85
Grab / Composite	Density	< 50	< 35	75 -125	85
Grab / Composite	Heat Content	< 50	< 35	75 -125	85
Grab / Composite	Total Chlorides	< 50	< 10	75 -125	85
Grab / Composite	Metals **(a)**	< 50	< 35	75 -125	85
Stack Flue Gas					
EPA Method 0023A	PCDDs/PCDFs	**(b)**	see Table 7-6	see Table 7-6	100
EPA Methods 5	PM and	**(b)**	±0.5 mg	±0.1 mg	100
EPA Methods 26A	HCl/Cl_2	**(b)**	see Table 7-6	see Table 7-6	100
EPA Method 29	Metals (a)	**(b)**	see Table 7-4	see Table 7-4	100
Facility CEMS	CO and O_2	**(b)**	± 3% span	± 3% span	100
EPA Method 3/3A	CO_2 and O_2	**(b)**	0.5%	0.5%	100

(a) Target metals in the LLGF include: arsenic, beryllium, cadmium, chromium, lead and mercury (MACT) plus copper, nickel & zinc.

(b) Precision not determinable for stack gas sampling since co-located sampling trains will not be used.

Note: This table represents an overall summary of the QA objectives for this project. Please refer to the method-specific QA summary tables in Section 7.0 of this QAPP.

3.2 Representativeness and Comparability

It is recognized that the usefulness of the data is also contingent upon meeting the criteria for representativeness and comparability. Wherever possible, reference methods and standard sampling procedures will be used. The QA objective is that all measurements be representative of the matrix and operation being evaluated. The detailed requirements for sampling given in the various EPA Reference Methods will be followed to ensure representative sampling of flue gases. The grab/composite sampling regimen for the boiler feed stream during each test run will also provide representative samples of this matrix.

The corresponding QA objective is that all data resulting from sampling and analysis be comparable with other representative measurements made by the field sampling team, on this or a similar process operating under similar conditions. The use of published sampling and analytical methods and standard reporting units will aid in ensuring the comparability of the data.

3.3 Data Usability and Detection Limit Considerations

AECOM and each of the subcontract laboratories on this program are aware of the requirement that all data generated for a program of this nature are of high quality and that detection limits reported are usable for compliance assessment purposes. We have reviewed the relevant EPA Region 6 guidance on this issue and believe that the data to be generated for this program will meet or exceed EPA's goals based on our past

experience with each specific laboratory on past similar programs. All of the laboratories to be used on this program follow 40 CFR Part 136, Appendix A for the determination of method-specific method detection limits (MDLs) for the various analytes to be measured in this program. However, for the purposes of data reporting for this program, method specific reporting limits (RLs) will be used wherever a sample is determined to be below detection. Two categories of such RLs is envisioned for this project:

- **Waste Feed Samples** – RLs for metals and total chlorides in the LLGF samples will be specific to the actual waste matrix. In the absence of actual detected values, the full value of the RL will be used in performing any required calculations pertaining to compliance with feed rate limits. The RLs to be reported for these parameters are equivalent to sample quantitation limits (SQLs) as defined by EPA, since they take into account any required sample dilutions.
- **Isotope Dilution Methods** – For this program, the only isotope dilution method is EPA Method 8290 (PCDDs/PCDFs). Reporting limits for this method incorporates specific criteria for development of estimated detection limits (EDLs) and estimated maximum possible concentrations (EMPCs). Emission calculations that rely on either the EDL or the EMPC are not expected to present any problems on this project. It is noted that for establishing compliance with the MACT PCDD/PCDF emission standard, detection limits can be treated as zero.
- **Non-Isotope Dilution Methods** – For this program, such methods include EPA Method 26A (PM and HCl / Cl_2). Reporting limits anticipated for these methods are not expected to present any problems on this project. The full value of any RL will be used in making any emission determinations if the analyte is reported below detection.

4.0 Sampling and Monitoring Procedures

This section describes the procedures that will be followed during the field sampling program. Throughout the overall program, all sampling will be performed using sampling protocols described herein and approved by the regulatory agencies. Agency approval will be obtained for any deviations from or changes to the approved QAPP which may be warranted prior to program implementation as a result of changes in personnel or facility circumstances. If situations occur during any preliminary testing that may be done prior to the CPT which necessitates deviations from the plan, the agency will be notified and onsite approval requested. Any such deviations from the specified protocols will be fully documented in the final report for the project.

A discussion of the compliance strategy, test conditions and sampling and analysis program was provided previously in Sections 1.0, 5.0 and 6.0 of the CPT Plan. In general, however, the test program is configured to collect samples during six (6) runs conducted under two (2) process operating conditions.

Sample team meetings will be held to designate responsibilities to each team member. Assignments will be based on individual experience and relative importance of the assigned task. Other activities performed in the office prior to the field test program include generation of sample checklists, printing of computer-generated sample labels, and proper packing of all equipment. Equipment will then be transported by truck to the sampling location. Site setup will involve moving the equipment to the vicinity of the sample collection area. A separate office trailer or other suitable onsite facility will be used to serve as a sample train setup and recovery area and sample custody area.

4.1 Kiln Feed Materials Sample Collection

4.1.1 Sampling Locations

The liquid waste feed material and shale feed will be sampled prior to being fed to the kiln in accordance with acceptable protocols. Taps in the feed line will be used to access the LLGF; shale will be sampled directly from the feed conveyor.

4.1.2 Sampling Procedures

Facility personnel will perform all feed stream sampling. Each sample will be assigned a unique sample code for identification. Sufficient quantity will be collected to allow for sample splits, backup or archived samples and duplicates, as applicable. (NYSDEC staff observing the test will provide their own sample bottles for sample splits.) Facility personnel will collect these samples under AECOM's direction using pre-cleaned sample bottles suitable for the type of sample being collected and the intended analysis. Adirondack will provide all sample containers and AECOM will assume custody of the samples at the end of each day. Prior to initiating CPT testing activities, AECOM will hold a training session with facility staff responsible for sample collection to review grab sampling techniques, size of sample aliquots, compositing procedures and sample bottles to be used. Agency staff members who will be providing test program oversight are invited to attend this training session. The feed materials will be characterized for the parameters outlined in **Table 4-1**.

Grab samples of LLGF will be collected at the beginning, middle and end of each run and will result in a single composite sample at the end of each run. Samples will be collected in appropriate sample bottles, depending on the analysis to be performed. Grab samples will be collected from sample taps. The sample tap is opened

and the line is flushed with the material being collected. The flush is then discarded into a container and managed appropriately, and then the specified sub-sample is collected. This ensures that the actual material collected is representative of the stream. At the prescribed frequency, liquid is collected into a large beaker or sample jar.

Raw shale feed will also be sampled at the beginning, middle and end of each test run. The shale will be sampled at the conveyor belt using a scoop with an appropriate aliquot being emptied into the final collection bottle.

Table 4-1 Sampling and Analysis Summary for Kiln Feed Materials

Analytical Parameter	LLGF	Shale
Total Chlorine	EPA M 5050 (Prep) EPA M 9253 (Silver Nitrate Titration)	EPA M 5050 (Prep) EPA M 9056 (IC)
Mercury	EPA M 7471A	EPA M 7471A
Other Metals	EPA M 3052 (Prep) EPA M 6010B	EPA M 3052 (Prep) EPA M 6010B
Sediments	ASTM D 1796-97 (Norlite SOP # 04-049)	Not Applicable
Ash Content	ASTM D 482-02	Not Applicable
Density	Gravimetric (Norlite SOP # 04-012)	Not Applicable
Heat Content	ASTM D 240-02	Not Applicable

4.2 Stack Emission Measurements

Gases discharged from the exhaust stack will be sampled for the following parameters:

- Flue gas velocity and flow rate, temperature, moisture content and composition of fixed gases (O_2 and CO_2);
- PCDDs/PCDFs;
- Particulate Matter
- HCl/Cl_2
- Metals; and
- CO corrected to 7% O_2

Table 4-2 provides a summary of the stack sampling protocols and procedures for the program. The following sections provide additional information on the sampling location and summaries of the sampling methodologies. In addition, example field data sheets to be used during the program are provided in **Attachment A**. Summaries of relevant information pertaining to setup and recovery of the isokinetic sampling train are provided in **Attachment B**.

Table 4-2 Overview of Stack Emission Measurement Program

Stream Sampled / Sampling Frequency	Test Parameter	Sampling Method	Analytical Method(s)
Stack Flue Gas			
3-hr run / 3 runs total	PCDDs/PCDFs	EPA Method 0023A	EPA Method 8290A
2-hr run / 3 runs total	PM and HCl/Cl_2	EPA Methods 5 and 26A	EPA Methods 5 and 26A
2-hr run / 3 runs total	Mercury	EPA Method 29	EPA Method 7470A
2-hr run / 3 runs total	Other Metals	EPA Method 29	EPA Method 6020A
3-hr run / 6 runs total	O_2 and CO_2	EPA Method 3A	EPA Method 3A
Facility CEMS / 6 runs total	CO_2 and O_2	Facility CEMS QA Plan	Facility CEMS QA Plan

4.2.1 Sampling Location

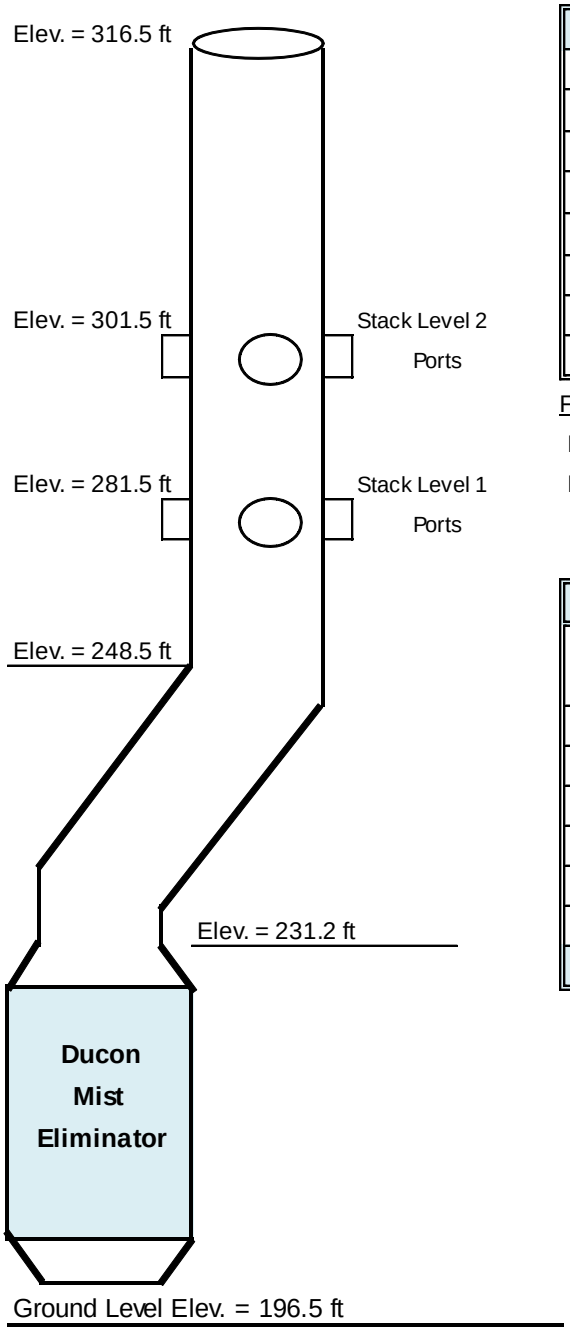
Exhaust gas samples will be collected in the outlet stack, which is 120 ft. above grade, has an inside diameter of 48 inches and is equipped with two sampling platforms. The samples will be collected from test ports that meet the minimum criteria specified in EPA Method 1. Level 1 ports are approximately 85 ft. above ground and Level 2 ports are about 105 ft. above ground. The Level 1 test ports will be used to accommodate simultaneous testing of all emissions test parameters. One of the selected traverse diameters will coincide with the plane containing the greatest expected concentration variation and the second diameter will be congruent to the direction of the bend.

Figure 4-1 provides a schematic of the stack showing the location of the sampling ports and the upstream/downstream distances from flow disturbances. This schematic drawing also provides a schematic of the traverse point locations applicable to the isokinetic sampling trains as well as key stack parameters needed to select the appropriate size sampling nozzle.

4.2.2 Gas Stream Velocity and Moisture

Gas stream flowrate, moisture and fixed gas concentration will be determined concurrent with the PM/HCl/Cl_2 and metals isokinetic sampling trains. Gas stream velocity will be determined using a Pitot tube and oil-gauge water manometer in accordance with EPA Method 2. Gas stream temperature will also be determined at each of the Method 2 traverse points using a Type “K” thermocouple and pyrometer. Gas stream moisture will be determined as specified in EPA Method 4 concurrent with the isokinetic sampling method. In this procedure the impinger contents are measured for volume or weighed before and after each test run and used in conjunction with the metered gas volume to determine the gas stream moisture content. Measurement of O_2 and CO_2 is for gas stream molecular weight determination and constituent oxygen correction.

Figure 4-1 Stack Sampling Traverse Point Locations



KEY STACK PARAMETERS		
Parameter	**Units**	**Value**
Temp.	°F	130
Moisture	% v/v	13.0
O_2	% v/v	14.9
CO_2	% v/v	4.6
Flowrate	dscfm	30,250
Vel. Press.	in. w.c.	0.70
Static P.	in. w.c.	1.00

From Disturbances:

Level 1: 8.25 diam. downstream & 8.75 diam. upstrean

Level 2: 13.25 diam. downstream & 3.75 diam. upstrea

TRAVERSE POINT DATA		
Pt. No.	**% of Diam.**	**Dist. Incl. Port (in.)**
1	4.4%	8.1
2	14.6%	13.0
3	29.6%	20.2
4	70.4%	39.8
5	85.4%	47.0
6	95.6%	51.9

Stack ID = **48** inches
Port + Wall = **6.0** inches

Kiln # 1 or # 2
Norlite LLC - Cohoes, NY

4.2.3 PCDDs / PCDFs

A Method 0023A sampling train will be used to sample for designated parameters. Specific sampling details for the Method 0023A sampling train are as follows:

- Target sampling rate - 0.75 cfm
- Sample run time - 3-hr
- Minimum sample volume required [as per 40 CFR 63.1208(b)(1)(ii)] - 2.5 dscm (88.3 dscf)
- Sample train rinse solvents: acetone, methylene chloride and toluene
- No. of sampling points per stack traverse - 6
- Total No. of sampling points - 12
- Number of field reagent blank sets collected – 1

The sampling train consists of 5 glass impingers connected in series with leak-free ground glass and Teflon o-ring connections. The first impinger is left empty and the second and third impingers are filled with 100-mL of HPLC water; the fourth impinger is empty and the fifth impinger is loaded with ~ 400 g of silica gel. The sampling train uses an untared glass fiber filter, an XAD resin trap and condensing module and is operated as specified in the method. Details pertaining to the setup and recovery of the sampling train are presented in **Attachment B** to this QAPP.

4.2.4 Metals

EPA Method 29 will be utilized for the collection of MACT and other metals including:

- MACT LVM metals – arsenic, beryllium and chromium;
- MACT SVM metals – cadmium and lead;
- Mercury; and
- Other metals for updating the facility's risk assessment and/or to fulfill other permit requirements: antimony, barium, copper, nickel, selenium, silver, thallium and zinc.

Specific sampling details for the Method 29 sampling train are as follows:

- Target sampling rate - 0.75 cfm
- Sample run time - 2-hr
- Estimated sample volume – 2.4 dscm (85.0 dscf)
- No. of sampling points per stack traverse – 6
- Total number of sampling points – 12
- Number of field reagent blank sets collected – 1

4.2.5 PM and HCl / Cl_2

Sampling for PM, HCl, and Cl_2 will be performed in accordance with EPA Methods 5 and 26A. Specific sampling details for the Method 26A sampling train are as follows:

- Target sampling rate - 0.75 cfm
- Sample run time - 2-hr
- Estimated sample volume – 2.4 dscm (85.0 dscf)
- No. of sampling points per stack traverse – 6
- Total number of sampling points – 12
- Number of field reagent blank sets collected – 1

4.2.6 Continuous Emission Monitoring – AECOM

Measurement of O_2 and CO_2 for gas stream molecular weight determination and constituent oxygen correction will be determined in accordance with EPA Method 3A (continuous instrument analyzer method) during all test runs.

4.2.7 Continuous Emission Monitoring – Norlite

Plant-owned CEMS, installed in the baghouse outlet, will be used during all test runs to monitor the concentrations of O_2 and CO in the stack gas and to measure flue gas flow rate. Specifications for Norlite's CEMS were provided earlier in Section 4.6 and **Table 4-3** of the CPT Plan. Stack gas is continuously drawn through a filter and heated sample transport line. The gas is conditioned to remove water, and any condensate is removed. The resulting dry gas flows into each of the gas analyzers. The O_2 results are used to correct the CO reading to 7% O_2 using the following equation:

$$CO_{Corr} = CO_{meas}\ X\ \frac{14}{21-Y}$$ Where,

CO_{Corr} = CO concentration corrected to 7% oxygen

CO_{meas} = CO concertation as measured directly in stack gas stream

Y = the oxygen content measured in the stack gas stream

From the O_2 corrected readings, a one-minute average CO concentration is calculated every minute. At each successive minute, the 60 most recent one-minute average CO concentrations are used to calculate an hourly rolling average (HRA) CO concentration. The one-minute and HRA CO (O_2 corrected) and O_2 concentrations are automatically recorded by the process control / data acquisition system. If the HRA CO concentration exceeds 100 ppmv corrected to 7% O_2, then an automatic waste feed cutoff (AWFCO) is initiated. As per the requirements of 63.1209(a)(3), one-minute average CO values that exceed the upper span limit for the analyzer (3,000 ppm) will be recorded as 10,000 ppm and used in the calculation of the HRA.

The system will be certified prior to conducting the CPT following the performance specification (PS) test procedures provided in PS 3 ("Specifications and Test Procedures for O_2 and CO_2 Continuous Emission Monitoring Systems in Stationary Sources") and 4B ("Specifications and Test Procedures for Carbon Monoxide and Oxygen Continuous Monitoring Systems in Stationary Sources") found in 40 CFR Part 60,

Appendix B. In addition, the certification will follow the general guidelines outlined in the Appendix to Subpart EEE ("Quality Assurance Procedures for Continuous Emissions Monitors Used for Hazardous Waste Combustors"). The CEMS certification will take place in accordance with the normal schedule followed by the facility on an annual basis. This normal schedule also includes daily calibrations and quarterly audits in accordance with the regulations.

5.0 Sample Custody

A variety of activities are performed prior to and during the field sampling program to ensure proper sample collection, documentation and sample transport. These activities include equipment calibration, sample media preparation, cleaning of sample train glassware, preparation of computer-generated sample labels, and other miscellaneous tasks. Each of these activities are described or referenced in the following subsections. Other pre-sampling activities include such details as team meetings, equipment packing and shipment, equipment setup, and finalization of all details leading up to the coordinated initiation of the sampling program.

5.1 Field Sampling Operations

5.1.1 Glassware Preparation

Sample train glassware and sample containers require specialized pre-cleaning to avoid contamination of the sample from the collection container or devices. Cleaning/storage procedures for sample train glassware are summarized below. Note that all bottle caps are fitted with Teflon liners which are cleaned in the same manner as the bottles themselves. Sample containers used for all waste feed and stack gas samples are purchased pre-cleaned and sealed to specified EPA protocols (PC class).

- **EPA Method 0023A glassware and containers (PCDDs/PCDFs)** - wash with soap and water, rinse three times with deionized (DI) water, bake at 400°C for 2-hours, rinse three times with pesticide grade methylene chloride, rinse three times with pesticide grade toluene and air dry. Open ends will be sealed prior to shipment to the field with clean aluminum foil.
- **EPA Method 29 glassware and containers (metals)** – wash with soap and water, rinse with hot tap water, and rinse three times with reagent water. The glassware is next soaked in a 10% nitric acid solution for a minimum of 4-hours, rinsed three times with reagent water, rinsed a final time with acetone and air dried. All glassware openings where contamination can occur will be covered with paraffin until the sampling train is assembled prior to sampling.
- **EPA Methods 5 and 26A glassware and components (PM and HCl/Cl_2)** – wash with soap and water, rinse three times with deionized (DI) water and air dry. Open ends will be sealed prior to shipment to the field with paraffin.

5.1.2 Sample Labels and Sampling Checklists

Preprinted sample identification labels are used to ensure that all required information is fully documented. When sample batches are shipped to the specified laboratory, a sample packing list (chain-of-custody form) such as that shown in **Figure 5-1** accompanies the shipment. This form is based on established laboratory format and will be used to document sample transfer in the field and from sampling personnel to the laboratory. AECOM uses an in-house proprietary program for generating sample labels and the accompanying sample packing lists. These lists are also used by the Field Team Leader to ensure that all samples are collected as planned and recovered and packed accordingly.

Figure 5-1 Sample Packing List and Sample Label

AECOM

Sample Packing List

Site of Program:	**Sample Date:**	**Project Location:**
Type of Program:	**Date Shipped:**	**Analytical Lab:**
Project #:	**Shipper:**	**Lab P.O. #:**
Program Office:	**Contact:**	**FedEx Air Bill #:**

Sample ID	Sample Matrix	Sample Description	Analyses	Instructions

Field Notes/ Comments

Relinquished By:	Date:	Received By:	Date:	**Analytical Laboratory Destination:**
Signature:	Time:	Signature:	Time:	

EXAMPLE SAMPLE LABEL

AECOM

Site of Program: _____
Project No.: _____

Sample Date: _____ Sample Matrix: _____
Analytical Parameters: _____
Sampler: _____
Sample Description: _____
Sample ID Code: _____
Special Instructions: _____

5.1.3 Preliminary Measurements

Normally, preliminary tests are conducted at the stack location to verify the presence or absence of cyclonic flow conditions and to determine flue gas moisture, temperature and velocity. These measurements facilitate determination of nozzle size selection and sample train operation rates for the isokinetic sampling trains. Extensive past testing on the Norlite kilns has indicated that cyclonic flow conditions do not exist and therefore a check for such conditions will not be necessary. All other preliminary measurements will be conducted.

5.1.4 Field Documentation

The field team leader will maintain a field log of all daily activities including facility preparations, sample run times, problems encountered, any corrective actions taken and other important events related to ash or POHC spiking or equipment operation. The field log will be included in an appendix of the final report.

All materials such as field and laboratory notebooks and logbooks, field and laboratory data records, correspondence, reports, sample tags, traceability records and instrument printouts will be clearly labeled with the project number and become a permanent part of the project file. Project samples will be disposed of in an appropriate manner 60 days after acceptance and approval of a final report. All project-related documentation at AECOM and the subcontractor laboratories will be kept on file for 2 years following submittal of the final report.

5.2 Field Laboratory Operations

5.2.1 Sample Media Preparation

All reagents will be checked in accordance with AECOM's existing QC Program to minimize the probability of using contaminated solvents. This includes the use of the proper grade reagents/solvents as specified in the test method, selection of reagents from the same lot and the collection and analysis of the appropriate blanks. Sampling media will be procured and prepared in accordance with the appropriate test methods as described below:

- **XAD resin** used in the Method 0023A sampling train is purchased new and packed in specially designed sorbent traps. All glass cleaning and sorbent packing procedures will follow the protocols specified in EPA Method 0023A.
- **Teflon filters** used in the Method 26A sampling train are purchased from Pallflex Products Co. with designated technical specifications and efficiency ratings.
- **Quartz filters** used in the Method 29 sampling train are purchased from Pallflex Products Co. who pre-screen filters for metals content.

5.2.2 Field Laboratory Facility

Norlite will provide an office space/work area or mobile trailer to serve as a clean area for equipment staging, sample train setup and recovery, team meetings and to serve as the central area for coordinating testing activities and interacting with facility and Agency personnel. Special areas will be established in this trailer for setting up and recovering the isokinetic sampling train and/or for performing preliminary equipment checks. The use of special designated areas for each sampling train will help to eliminate sample train cross-contamination and ensure that the appropriate solvents and reagents are kept in their own specific area for use on the sampling train intended.

5.2.3 Sample Storage

Sample integrity will be maintained throughout all phases of the sampling and analysis program. Samples will be held within sight of the samplers or sample custodian, or will be kept in sealed or secured containers at all times. Sealed coolers and DOT shipping boxes will be used to ship samples to the designated laboratory via Priority 1 overnight FedEx service.

5.2.4 Sample Shipment

The AECOM field team leader will coordinate the packing and shipment of all samples. Worksheets specifically designed for this program will be generated prior to the field effort. These sheets will assist in assuring that all samples have been collected, accounted for and shipped under sample traceability documentation to the appropriate laboratory.

5.2.5 Sample Preservation and Holding Times

All samples will be kept on ice in method-specific coolers until they are ready for shipment to the designated laboratory. As stated earlier, these samples will be shipped in either sealed coolers or DOT shipping boxes (dangerous goods items). **Table 5-1** below provides additional requirements pertaining to sample preservation and recommended holding times.

Table 5-1 Sample Preservation and Holding Time Requirements

Stack Gas Samples [(a)]

Parameter	Matrix	Preservation	Holding Time
PCDDs/PCDFs (Method 0023A)	XAD Resin	Cool, 4°C	30 days (to extraction)
			45 days (extraction to analysis)
Mercury (Method 29)	Aqueous	Cool, 4°C	28 days
	Solid/Filter	Cool, 4°C	28 days
Non-Mercury Metals (Method 29)	Aqueous	Cool, 4°C	6 months
	Solid / Filter	Cool, 4°C	6 months
HCl /Cl_2 (Method 26A)	Aqueous	N/A	30 days
[(a)] Holding times will be calculated from the day of sample collection.			

Waste Feed Samples

Parameter	Matrix	Preservation	Holding Time
Metals	Aqueous Liquid	Cool	6 months

Parameter	Matrix	Preservation	Holding Time
Metals - Mercury	Aqueous Liquid	Cool	28 days
Total Chlorine	Aqueous Liquid	Cool	30 days

6.0 Field Equipment Calibration Procedures and Frequency

A very important aspect of pre-sampling preparations is the inspection and calibration of all equipment planned to be used for the field effort. Equipment is inspected for proper operation and durability prior to calibration. Calibration of equipment is conducted in accordance with the procedures outlined in the EPA document entitled "Quality Assurance Handbook for Air Pollution Measurement Systems; Volume III—Stationary Source Specific Methods" (EPA/600/R-94/038c, September 1994). Equipment calibration is performed in accordance with EPA guidelines and/or manufacturer's recommendations. Documentation of all calibration records will be kept in the project file during the field program and will be available for inspection by test observers. Recommended practices from the QA Handbook for field equipment to be used during this program and specific calibration procedures performed by AECOM are listed below.

- **Sampling Nozzles** [QA Handbook Section 3.4.2, pg. 19 - make three measurements of the nozzle ID (to the nearest 0.001 in.) using different diameters with a micrometer. Difference between the high and low values should not exceed 0.004 in. Post-test check - inspect for damage.] Each glass nozzle is calibrated with a micrometer prior to testing and identified with a unique ID number. Any stainless steel nozzles used during the program are calibrated onsite prior to testing.
- **Pitot Tubes** [QA Handbook Section 3.1.2, pp. 1-13 - measured for appropriate spacing and dimensions or calibrate in a wind tunnel. Rejection criteria given on the calibration sheet. Post-test check - inspect for damage.] Each S-type stainless steel Pitot tube used is designed to meet geometric configurations as defined in EPA Method 2.
- **Thermocouples** [QA Handbook Section 3.4.2, pp. 15-18 - verify against a mercury-in-glass thermometer at two or more points including the anticipated measurement range. Acceptance limits - impinger ±2°F; DGM ±5.4°F; stack ±1.5 percent of stack temperature.] The Type K thermocouples in each meter control box, heated sample box, impinger umbilical connector, XAD resin trap, and sample probe are calibrated against ASTM mercury-in-glass thermometers at two or more points: an ice bath, ambient temperature and a boiling water bath.
- **Dry Gas Meters** [QA Handbook Section 3.4.2, pp. 1-12 - calibrate against a wet test meter or calibrated orifice. Acceptance criteria - pretest Yi = Y ± 0.02; post test Y = ± 0.05 Yi.] Dry gas meters for all sampling trains are calibrated using critical orifices. The procedure entails four runs using four separate critical orifices running at an actual vacuum 1-2 in. greater than the theoretical critical vacuum. The minimum sample volume required per orifice is 5 ft^3. Meter boxes are calibrated annually and then verified by use of the alternative Method 5 post-test calibration procedure. This procedure is based on the principles of the optional pretest orifice meter coefficient check outlined in Section 4.4.1 of Method 5. The average Y-value obtained by this method must be within 5% of the initial Y-value.
- **Field Balance** The analytical balance used in the field to determine initial and final silica gel weights is calibrated against Class M weights provided by the Mettler Corporation.
- **Field Barometer** [QA Handbook Section 3.4.2, pp. 18-19 - compare against a mercury-in-glass barometer or use Airport Station BP and correct for elevation. Acceptance criteria - ± 0.02 in. Hg; post-test check - same.] In the absence of pressure readings from an onsite laboratory or other weather station, BP readings will be obtained from the closest airport and corrected for elevation (-0.10 in. Hg per 100-ft of elevation increase as per Section 6.1.2 of EPA Reference Method 5).

- **CEMS Equipment and Instrumentation** – Although not planned for this field program, should any CEMS equipment be brought to the site, it will be housed in a dedicated trailer that is transported to the test site and set up adjacent to the sampling location. All equipment (analyzers, calibration gases and ancillary equipment) is thoroughly checked prior to each job and the appropriated calibration standards are procured. Daily calibrations and other instrument bias checks are performed in accordance with the specific method followed.

All field equipment is calibrated annually or more often if problems occur. Copies of all calibration data for the equipment to be used on this test will be brought to the test site and a copy will be made available to the test observer, if requested. All calibration data are also subsequently included in the final report appendices.

7.0 Analytical Methods and Procedures

This section delineates the analytical protocols that will be followed to analyze samples during this test program. The methods cited will be followed as written unless specific modifications are made in the laboratory's standard operating procedures (SOPs). Samples of kiln feed materials and stack gas will be collected and analyzed for the parameters previously discussed using the appropriate laboratory protocols detailed in this section and as outlined previously in Section 6.0 of the CPT Plan. All referenced EPA methods will be from SW-846, 3rd edition, unless noted otherwise.

Table 7-1 below provides a detailed summary of the overall sampling and analysis program including the number of field, QA/QC and audit samples anticipated for the program. Appropriate accreditations and/or certifications for each analytical laboratory are provided in **Appendix D** of this document.

Table 7-1 Detailed Overview of Sampling and Analysis Program

Stream / Sampling Method	Analytical Parameters	Analytical Method	Lab **(a)**	Total Samples Analyzed				
				Field Runs	Field Blanks	Audit	Lab QC	Total
Liquid Feeds [LLGF and Used Oil (if fed)] --								
Grab / Composite	Mercury	EPA M 7471B & EPA M 3050B/7470A	ADIR	3	0	0	2	5
	Other Metals **(b)**	EPA M 3052/6010C	ADIR	3	0	0	2	5
	Density	Gravimetric **(c)**	NORL	3	0	0	1	4
	Total Chlorine	EPA M 5050 EPA M 9253	ADIR	3	0	0	2	5
	Ash Content	ASTM D 482-02	ADIR	3	0	0	1	4
	Sediment	ASTM D 1796 **(d)**	ADIR	3	0	0	1	4
	Heat Content	ASTM D 240-02	ADIR	3	0	0	1	4
Shale --								
Grab / Composite	Mercury	EPA M 7471A	ADIR	3	0	0	2	5
	Other Metals **(b)**	EPA M 3052/6010C	ADIR	3	0	0	2	5
	Total Chlorine	EPA M 5050 / 9056	ADIR	3	0	0	2	5
Stack Gas --								
EPA M 26A	PM	EPA M 5	AECOM	3	1	0	1	5
	HCl and Cl_2	EPA M 26A	TA-KNOX	3	1	1	2	7
EPA M 0023A	PCDDs/PCDFs	EPA M 8290A	VISTA	3	1	0	2	6
EPA M 29	Mercury	EPA M 7470A	TA-KNOX	3	1	1	2	7
EPA M 29	Other Metals (b)	EPA M 6020A	TA-KNOX	3	1	1	2	7
EPA M 3	O_2 & CO_2	EPA M 3A (CEMS)	AECOM	3	1	0	0	4
Facility CEM	O_2 and CO	Facility CEM QA Plan	NORL	3	0	0	0	3

(a) Laboratories identified as follows:
ADIR = Adirondack Environmental Services in Albany, NY
AECOM = AECOM's Air Toxics Laboratory, Harvard, MA.
NORL = Norlite onsite laboratory.
TA-KNOX = TestAmerica Labs in Knoxville, TN
VISTA = VISTA Analytical Laboratory, El Dorado Hills, CA

(b) Other metals: arsenic, beryllium, cadmium, chromium and lead (MACT) plus antimony, barium, copper, nickel, selenium, silver, thallium and zinc.

(c) Density determination will be in accordance with Norlite's analytical SOP # 04-012.

(d) Sediment determination will be in accordance with Norlite's analytical SOP # 04-049.

7.1 Analysis of Kiln Feed Materials

Analyses to determine the chemical and physical properties and metals content of the kiln feed materials will be performed using appropriate ASTM or EPA analytical methods as summarized in **Table 7-2** below. Quality assurance requirements for these determinations are summarized in **Tables 7-3 and 7-4**.

Table 7-2 Sampling and Analytical Summary for LLGF and Shale

Analytical Parameter	LLGF	Shale
Total Chlorine	EPA M 5050 (Prep) EPA M 9253 (Silver Nitrate Titration)	EPA M 5050 (Prep) EPA M 9056 (IC)
Mercury	EPA M 7471A	EPA M 7471A
Other Metals	EPA M 3052 (Prep) EPA M 6010B	EPA M 3052 (Prep) EPA M 6010B
Sediment	ASTM D 1796-97 (Norlite SOP # 04-049)	Not Applicable
Ash Content	ASTM D 482-02	Not Applicable
Density	Gravimetric (Norlite SOP # 04-012)	Not Applicable
Heat Content	ASTM D 240-02	Not Applicable

Table 7-3 QA/QC Procedures for Total Chlorine in Kiln Feed Materials

Quality Parameter	Method Determination	Frequency	Target Criteria
Calibration	Initial analysis of blank plus 3 standards	Prior to sample analysis	Instrument dependent. Linear correlation coefficient >=0.995
	Continuing calibration standards	Before and after sample analysis; once per batch	90%-110% of expected value
Accuracy - calibration	Analysis of calibration check standard	After every calibration	90%-110% of expected value
Accuracy - spikes	Spike sample at twice sample level	Once every 20 samples	80% to 120% of expected value
Accuracy – SRM	Analysis of a standard reference material (SRM)	Once per test	90% to 110% of reference value
Precision	Duplicate preparation and analysis of at least one run's samples	Once per waste stream	10% RPD
Blank	Method blank carried through all sample preparation and analysis steps	Once per batch	Below detection limit
Detection Limit Determination	MDL determination on actual run sample aliquots, spiked at 3-5x estimated MDL as defined in 40 CFR Part 136, Appendix B	Once during the CPT if analyte(s) reported as ND	As per the method

Table 7-4 QA/QC Procedures for Metals in Kiln Feed Materials

Quality Parameter	Method Determination	Frequency	Target Criteria
Calibration	Initial analysis of standards at different concentration levels	At least once before sample analysis	Instrument-dependent. Linear correlation coefficient >=0.995
	Continuing mid-range calibration standard	Before and after sample analysis	80% to 120% of expected value for GFAA and CVAA. 90% to 110% of expected value for ICAP
Interference check	Interference check sample	Before ICAP analysis	80% to 120% of expected value
Accuracy – calibration	Analysis of calibration check standard	After every initial calibration	90% to 110% of expected value
Accuracy – spikes (pre-digestion)	Aliquot of one sample from a run spiked with analytes at 3 times the detection limit or twice the sample level prior to digestion **(a)**	One per sample matrix	70% to 130% recovery
Accuracy – SRM	Analysis of NIST standard reference material (SRM)	Once per matrix	80% to 120% of stated reference value
Precision	Duplicate preparation and analysis of one sample from each matrix	One per sample matrix	Range < 35% if sample result above lowest standard
Blank	Method blank carried through all sample preparation and analysis steps	Once per sample batch	Below detection limit
Detection Limit Determination	MDL determination on actual run sample aliquots, spiked at 3-5x estimated MDL as defined in 40 CFR Part 136, Appendix B	Once during the CPT if analyte(s) reported as ND	As per the method

GFAA = graphite furnace atomic absorption

CVAA = cold vapor atomic absorption

ICAP = inductively coupled argon plasma

(a) The initial spiking level will be approximately 3 times the detection limit. If spike recoveries are not acceptable due to matrix interference, the analysis will be repeated with spiking levels at twice the sample concentration.

7.2 Analysis of Stack Gas Samples

7.2.1 PCDDs / PCDFs in Stack Gas Samples

Stack flue gas samples collected using the Method 0023A sampling train will be analyzed for polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDDs/PCDFs) by Vista Analytical. Each sampling train will be prepared and split appropriately as specified in Method 0023A. Separate front half and back half analyses will be performed. Vista Analytical (El Dorado Hills, CA) will perform these analyses following the cited method in conjunction with Vista SOP # 19.

Method 0023A analyses (which include high resolution GC/MS as per EPA Method 8290A) incorporate five isotopically labeled PCDD and PCDF field surrogates and nine labeled PCDD/PCDF internal standards. **Table 7-5** summarizes the spiking quantities for all standards and surrogates for this program. The field surrogates are spiked into the XAD resin prior to field sampling; their recoveries are monitored to assess overall method accuracy and precision. The internal standards are added to the appropriate fraction at a spiking level of 4,000 pg/sample prior to Soxhlet extraction. These internal standards are used for direct quantification of all surrogate and native PCDD/PCDF species. The addition of these standards prior to the extraction and cleanup procedures permits internal correction for any losses of target analytes that might occur during the preparation steps. Method 8290 details instrument tune, GC column performance and instrument calibration requirements for the analysis of stack gas samples by high resolution gas chromatography/high resolution mass spectrometry. Instrument calibration will be performed for all 15 2,3,7,8- substituted PCDD and PCDF isomers; data will be reported for each of these target analytes and for the total dioxins and total furans at each level of chlorination from Cl_4 through Cl_8. QA/QC requirements for these analyses are summarized in **Table 7-6.**

Table 7-5 Standard Spiking Requirements for Method 0023A

Type of Standard	Time of Addition	Analytes	Amount Added (pg/sample)
Prespike (PS)	Prior to sampling	37Cl4-2,3,7,8-TCDD	1,000
		13C-2,3,4,78-PeCDF	4,000
		13C-1,2,3,4,7,8-HxCDD	4,000
		13C-1,2,3,4,7,8-HxCDF	4,000
		13C1,2,3,4,7,8,9-HpCDF	4,000
Native	Prior to extraction (OPR only)	2,3,7,8-TCDD	2,000
		2,3,7,8-TCDF	2,000
		1,2,3,7,8-PeCDD	2,000
		2,3,4,7,8-PeCDF	2,000
		1,2,3,7,8-PeCDF	2,000
		1,2,3,4,7,8-HxCDD	2,000
		1,2,3,6,7,8-HxCDD	2,000
		1,2,3,7,8,9-HxCDD	2,000
		1,2,3,4,7,8-HxCDF	2,000
		1,2,3,6,7,8-HxCDF	2,000
		1,2,3,7,8,9-HxCDF	2,000
		2,3,4,6,7,8-HxCDF	2,000
		1,2,3,4,6,7,8-HpCDD	2,000
		1,2,3,4,6,7,8-HpCDF	2,000
		1,2,3,4,7,8,9-HpCDF	2,000
		OCDD	2,000
		OCDF	2,000
Internal (IS)	Prior to extraction	13C-2,3,7,8-TCDD	4,000
		13C-2,3,7,8-TCDF	4,000
		13C-1,2,3,7,8-PeCDD	4,000
		13C-1,2,3,7,8-PeCDF	4,000
		13C-1,2,3,6,7,8-HxCDD	4,000
		13C-1,2,3,6,7,8-HxCDF	4,000
		13C-1,2,3,4,6,7,8-HpCDD	4,000
		13C-1,2,3,4,6,7,8-HpCDF	4,000
		13C-OCDF	4,000
		13C-OCDD	4,000
Cleanup (AS)	Before cleanup	13C-1,2,3,7,8,9-HxCDF	4,000
Recovery	Prior to analysis	13C-1,2,3,4-TCDD	2,000
		13C-1,2,3,4-TCDF	2,000
		13C-1,2,3,7,8,9-HxCDD	2,000

Table 7-6 QA Objectives for PCDD/PCDF Analysis of Stack Gas Samples

Quality Parameter	Method Determination	Frequency	Target Criteria
Calibration	Five-level calibration curve; continuing calibration standard	At least once; continuing calibration check at beginning of each 12-hr shift	Initial: <=20% RSD for unlabelled standards <=20% RSD for internal standards S/N ratio >=2.5; Isotope ratios within control limits Continuing: <=20% of ICAL for 17 unlabelled stds <=30% of ICAL for internal standards S/N ratio >=10; Isotope ratios within control limits
Accuracy-calibration	Analysis of calibration check	After every initial calibration	80% - 120% of theoretical value
Accuracy-surrogates	Spiked into samples prior to sampling	Every sample	70% - 130% recovery
Accuracy-internal standards	Spiked into samples prior to extraction and analysis	Every sample	40%-135% recovery for tetra – octa homologs
Accuracy – audit samples	Prepared and analyzed along with program samples	Presented by the regulatory agency	Determined by regulatory agency
Blanks	Method blank for each component Field blank	One per batch of samples Once per test	ND or <5% of field concentration Evaluated on a case-by-case basis
Mass Spectrometer Performance	Section 9.3.2 of Method 8290	At the beginning and end of each 12-hr period	Static resolving power of 10,000 (10% valley definition)
GC Performance	Retention Time and GC Column Performance	At the beginning of each 12-hr period	Compliance with Section 9.3.1 of Method 8290
Qualitative Identification	Identification Criteria	Every sample	Compliance with Section 11.8.4 of Method 8290

S/N = Signal to Noise Ratio
RSD = Relative Standard Deviation

7.2.2 Metals in Stack Gas Samples

Each sampling train will be prepared and analyzed by TA Knoxville in accordance with EPA Reference Method 29. Target parameters will be reported separately in each sample train fraction (as outlined below) and blank-corrected in accordance with method-specific procedures.

From each sampling train, seven individual samples are generated for analysis. The first two samples, labeled Fractions 1A and 1B consist of the digested sample from the front half of the train, consisting of the particulate

filter and the front-half nitric acid probe rinse. Fraction 1A is for inductively coupled argon plasma emission spectroscopy (ICAP) analysis and Fraction 1B is for mercury analysis. Fractions 2A and 2B consist of digestates from the moisture knock out and HNO_3/H_2O_2 impingers 1, 2, and 3. Fraction 2A is for ICAP analysis and Fraction 2B is for mercury analysis. Fractions 3A, 3B, and 3C consist of the impinger contents and rinses from the empty and permanganate impingers 4, 5, and 6. These fractions will be analyzed for mercury.

Note for this CPT ICAP sample fractions will not be analyzed for other metals.

Mercury analysis will be performed using EPA Method 7470A (SW-846, 3rd Edition). All quality control procedures, including the interference check standard, will be followed as described in the method.

Instrument calibration will be performed daily in accordance with the procedures described in Method 6020A and the manufacturer's instructions. The calibration is verified daily by analysis of an instrument check standard prepared from an EPA quality control concentrate or other independent standard.

QA/QC requirements for the analysis of metals in stack gas samples are summarized in **Table 7-7**.

Table 7-7 QA Requirements for Metals in Stack Gas by ICP-MS and CVAAS

Quality Parameter	Method Determination	Frequency	Target Criteria
Calibration	Continuing mid-range calibration standard	At least once before and after sample analysis	90-110%
	Continuing calibration blank	With continuing calibration standard	Subject to interpretation
Accuracy - ICV	Analysis of calibration check standard	After every initial calibration	90% to 110% of true value
Accuracy - filters	Analysis of EPA audit filters, if provided	Once per test	70% to 130% of reference value
Accuracy	LCS / LCSD	Once per test	As per lab's historical limits
Precision	LCS / LCSD	Once per test	RPD < or = 35%
Blanks	Field Reagent Blanks and Method Blanks	One each per test	Evaluated on case by case basis

RPD = Relative Percent Difference LCS = Lab Control Sample LCSD = Lab Control Sample Duplicate

7.2.3 Hydrogen Chloride and Chlorine in Stack Gas Samples

Impinger samples from the Method 26A sampling train will be analyzed by TA Knoxville by ion chromatography in accordance with EPA Method 26A without any further preparation.

The sodium hydroxide impinger samples are treated with sodium thiosulfate in the laboratory, the pH of the solution is adjusted to >9 by adding NaOH (10N) drop wise. The samples is treated with sodium thiosulfate by adding 20 µL sodium thiosulfate (1.0N). If the final dilution required exceeds 500, the sample is re-prepared by

adding 20 µL sodium thiosulfate (1.0N) for each 500-fold dilution. QA/QC procedures for these analyses are presented in **Table 7-8**.

Table 7-8 QA Requirements for Chlorides in Stack Gas

Quality Parameter	Method Determination	Frequency	Target Criteria
Calibration (Qualitative)	Average retention time	Every calibration curve	Within retention time window of standards
Calibration (quantitative)	Initial calibration with a minimum of four standards	At least once before sample analysis	Linear correlation coefficient > 0.995
	Continuing calibration	Every 10 samples and at end of day	90% - 110% of theoretical concentration
Accuracy (calibration)	Laboratory control sample	Before sample analysis	90% - 110% of true value
Accuracy (spikes)	Matrix spikes	Once per test	70% - 130% recovery
Precision	Duplicate analyses	All samples	RPD < or = 35%
Field Reagent Blanks	Collection of method-specified volumes of each reagent	Once per test	Less than 5% of sample levels
Blank	One method blank carried through sample preparation and analysis	Once per test	Less than 5% of sample levels
RPD = Relative Percent Difference			

7.2.4 Particulate Matter in Stack Gas Samples

Gravimetric analyses will be performed by AECOM on samples collected from the Method 5/26A PM/HCl/Cl_2 train. Weights will be obtained on the front-half acetone rinse and particulate filter using a Mettler H35 analytical balance. Balance accuracy is checked by using Class "S" standard weights before and after tare weighings and sample determinations. Sample fractions are dried to constant weight, defined as two successive weighings at a 6-hr interval showing a weight change of less than 0.5 mg.

8.0 Quality Control Procedures

Quality control checks will be performed to ensure the collection of representative samples and the generation of valid analytical results for these samples. These checks will be performed by project participants throughout the program under the direction of the Project Manager and the QA Officer.

8.1 Field Sampling QC Procedures

QC checks for the process data collection and sampling aspects of this program will include, but not be limited to, the following:

1. Use of standardized data sheets, checklists and field notebooks to ensure completeness, traceability, and comparability of the process information and samples collected.

2. Field checking of standardized forms by the Field Team Leader and a second person to ensure accuracy and completeness.

3. Strict adherence to the sample traceability procedures.

4. Submission of field biased blanks.

5. Leak checks of sample trains before and after sample collection and during the test, when appropriate.

8.1.1 Equipment Inspection, Maintenance and Calibration

AECOM maintains a dedicated facility for storage, maintenance, repair and calibration of all field equipment. Prior to each job, project participants fully inspect and prepare all equipment that will be used.

Calibration of the field sampling equipment is performed in accordance with procedures recommended by the manufacturer and as described earlier in Section 6.0. Copies of the calibration sheets will be available onsite during the field sampling program for inspection, will be kept in the project file and will be incorporated as an appendix in the final report. Calibrations will be performed as described in the EPA publication "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods;" Section 4.2.1 presents acceptance limits.

8.1.2 Sampling Equipment QC Checks and Frequency

Leak checks of the sample trains will be conducted in accordance with the protocol called out for each method. Leak checks will be conducted prior to and at the end of sample collection and during the test run, if the sampling train is disassembled for any reason or if the port change requires extensive movement of the train.

Field blanks of reagents and collection media (deionized water, filters, impinger solutions, sorbent material, etc.) will be placed in appropriately cleaned and sized sample containers in the field and handled in the same way as actual field samples, to provide a QC check on sample handling.

For this program, sample collection QC checks and frequency for samples to be analyzed in the laboratory are listed below:

- One set of reagent/media blanks from the Method 0023A (PCDDs / PCDFs) sampling train
- One set of reagent/media blanks from the Method 29 (metals) sampling train
- One set of reagent/media blanks from the Method 26A (PM, HCl / Cl 2) sampling train

8.2 Analytical QC Procedures

The Quality Control program for laboratory analysis makes use of a number of different types of QC samples to document the validity of the generated data. The following types of QC samples will be used during the program.

8.2.1 Quality Control Samples and Blanks

Method Blanks

Method blanks contain all the reagents used in the preparation and analysis of samples and are processed through the entire analytical scheme to assess spurious contamination arising from reagents, glassware, and other materials used in the analysis.

Calibration Check Samples

One of the working calibration standards which is periodically used to check that the original calibration is still valid.

Laboratory Control Samples (LCS) or Blank Spikes

These samples are generated from spikes prepared independently from the calibration concentrates. The LCS are used to establish that an instrument or procedure is in control. An LCS is normally carried through the entire sample preparation and analysis procedure also.

Surrogate Spikes

Samples requiring analysis by GC/MS are routinely surrogate-spiked with a series of deuterated analogues of the components of interest. It is anticipated that these compounds would assess the behavior of actual components in individual program samples during the entire preparative and analysis scheme.

The percent recovery for each surrogate will be calculated in accordance with method-specific procedures. Any values which fall outside the target QC limits described in the applicable analytical method will be flagged. Some of these recovery values may be outside the QC limit owing to matrix interferences. The following guidelines will be used:

1. All recovery data are evaluated to determine if the QC limits are appropriate and if a problem may exist even though the limits are being achieved (e.g., one compound that is consistently barely within the lower limit).

2. Any recovery data which are outside the established limits are investigated. This evaluation will include an independent check of the calculation.

3. Corrective action will be performed if any of the following are observed:

   - All recovery values in any one analysis are outside the established limits, where one analysis is considered to be one sample analyzed by one method,
   - Over 10 percent of the values for a given sample delivery group are outside limits, or
   - One compound is outside the limits in over 10 percent of the samples.

An analysis batch is defined as a group of ten or fewer samples carried through the entire preparation and analysis procedure in one batch.

Reagents used in the laboratory are normally of analytical reagent grade or higher purity; each lot of acid or solvent used is checked for acceptability prior to laboratory use. All reagents are labeled with the date received and date opened. The quality of the laboratory deionized water is routinely checked. All glassware used in the sampling and analysis procedures will be pre-cleaned according to the method requirements. Standard laboratory practices for laboratory cleanliness, personnel training and other general procedures are used. The results of these quality control procedures will be included in the final report.

9.0 Performance and System Audits

The sampling, analysis, and data handling segments of a project are checked in performance audits. A different operator/analyst prepares and conducts these audit operations to ensure the independence of the quantitative results.

EPA Quality Control concentrates or other standards will be used to assess the analytical work. Results will be reviewed by the subcontractor laboratory and QC personnel. AECOM will obtain commercially available audit samples from accredited audit sample provider and are evaluated during the performance test program. Audit samples as identified in Section 2.3 and **Table 7.1** will be analyzed along with program samples, by the appropriate lab and at the same time as all other samples. Per the audit program, the results of these audits will be reported to the NYSDEC.

If the regulatory agency advises facility program manager that audit results fall outside of acceptable ranges, the analytical data will be further reviewed for error in conjunction with the agency. If a simple, correctable error is found (e.g., an arithmetic error), correction will be made and results resubmitted. If no error is found, an investigation into other causes of the failure (e.g., lack of sample integrity) will be conducted and results evaluated in terms of the impact on sample data integrity.

10.0 Preventive Maintenance

This section provides pertinent information for field sampling equipment as well as a listing of all critical facility equipment necessary to maintain permitted operating conditions and to demonstrate continuing compliance. Information is provided for preventive maintenance and schedules and spare parts for key equipment and instrumentation.

10.1 Field Sampling Equipment

AECOM follows an orderly program of positive actions to prevent the failure of equipment or instruments during use. This preventive maintenance and careful calibration helps to ensure accurate measurements and minimal field delays.

All equipment that is scheduled for field use is calibrated as outlined previously in Section 6.0. Prior to each field use for a specific project, the equipment is cleaned and checked to ensure it is in good working order. An adequate supply of spare parts and sample train glassware is brought to each site to minimize downtime and field sampling delays. Any equipment that does experience problems is appropriately tagged in the field to ensure that it is repaired upon return to the office. In addition, the Avogadro equipment facility is located within 30 miles of the SMR facility and thus any spare parts not readily available onsite can be obtained quickly, if necessary.

10.2 Facility Equipment and Instrumentation

Norlite performs scheduled and preventative maintenance programs on the process equipment including mechanical, electrical, structural and instrument systems. These programs are designed with predictive maintenance goals to minimize and/or eliminate unscheduled shutdowns. Norlite operators perform daily inspections of equipment as well as perform scheduled preventative maintenance services such as cleaning, oiling and greasing of components. Generally, on a quarterly basis, vibration surveys are completed on all rotating equipment. Also on a quarterly basis, each kiln system is shutdown to perform scheduled maintenance tasks lasting 1 to 2 days. On annual or less frequent basis, the combustion systems are shutdown for major equipment overhauls lasting from 3 to 14 days.

11.0 Procedures Used to Assess Data Precision and Accuracy

The QA activities implemented in this program will provide a basis for assessing the accuracy and precision of the analytical measurements. Section 8.0 of this QAPP discusses the various QA activities that will generate the accuracy and precision data for each sample type. A generalized form of the equations that will be used to calculate accuracy, precision and completeness follows.

11.1 Accuracy

Accuracy (calculated as percent recovery) will be determined using the following equation:

$$\text{\% Recovery} = \frac{(X - S)}{T} x\,100$$

where:

X = experimentally determined concentration of the spiked sample

T = true concentration of the spike

S = sample concentration before spiking

11.2 Precision

Precision (calculated as percent relative difference) will be determined using the following equation:

$$\text{Relative Percent Difference (RPD)} = \left[\frac{(D_1 - D_2)}{\left\{ \frac{D_1 + D_2}{2} \right\}} \right] x\,100$$

where:

D_1 and D_2 = results of duplicate measurements or standard deviation relative to the average value expressed as relative standard deviation:

Relative standard deviation will be expressed as follows:

$$\text{Relative Standard Deviation (\% RSD)} = \left\{ \frac{\sigma_{(n-1)}}{\bar{x}\,(x_1 \cdots x_n)} \right\} x \quad 100$$

where:

$\sigma_{(n-1)}$ = standard deviation of the sample data

n = number of replicates

$x_{(x1..xn)}$ = arithmetic mean of the sample data

11.3 Completeness

Data completeness is a measure of the extent to which the database resulting from a measurement effort fulfills objectives for the amount of data required. For this program, completeness will be defined as the percentage of valid data for the total valid tests. Completeness is assessed using the following equation:

$$\text{Completeness (\%)} = \left[\frac{D_r}{D_c} \right] x \quad 100$$

where:

D_r = number of samples for which valid results are reported

D_c = number of valid samples that are collected and reach the laboratory for analysis

The completeness objective will help to evaluate the accuracy and precision of the analytical measurements.

12.0 Corrective Actions

The acceptance limits for the sampling and analyses to be conducted in this program will be those stated in the method or defined by the project manager. The corrective actions are likely to be immediate in nature and most often will be implemented by the analyst or Project Manager; the corrective action will usually involve recalculation, reanalysis, or repeating a sample run. Ongoing corrective action policy is described here.

12.1 Immediate Corrective Action

Specific QC procedures and checklists are designed to help analysts detect the need for corrective action. Often the person's experience will be more valuable in alerting the operator to suspicious data or malfunctioning equipment.

If a corrective action can be taken at this point, as part of normal operating procedures, the collection of poor quality data can be avoided. Instrument and equipment malfunctions are amenable to this type of action and QC procedures include troubleshooting guides and corrective action suggestions. The actions taken should be noted in field or laboratory notebooks but no other formal documentation is required, unless further corrective action is necessary. These on-the-spot corrective actions are an everyday part of the QA/QC system.

Corrective action during the field sampling portion of a program is most often a result of equipment failure or an operator oversight and may require repeating a run. When equipment is discovered to be defective (i.e., pre- and post-sampling leak check) it is repaired or replaced and a correction factor is established as per the EPA method. If a correction factor is unacceptable the run is repeated. Operator oversight is best avoided by having field crew members audit each other’s work before and after a test. Every effort is made by the field team leader to ensure that all QC procedures are followed. Economically, it is preferred to repeat a run during a particular field trip rather than return at a later date.

Corrective action for analytical work would include re-calibration of instruments, reanalysis of known QC samples and, if necessary, of actual field samples.

If the problem is not solved in this way, more formalized long-term corrective action may be necessary.

12.2 Long-Term Corrective Action

The need for this action may be identified by standard QC procedures, control charts, performance or system audits. Any quality problem which cannot be solved by immediate corrective action falls into the long-term category. The condition is reported to a person responsible for correcting it who is part of the closed-loop action and follow-up plan.

The essential steps in the closed-loop corrective action system are:

- Identify and define the problem.
- Assign responsibility for investigating the problem.
- Investigate and determine the cause of the problem.

- Determine a corrective action to eliminate the problem.
- Assign and accept responsibility for implementing the corrective action.
- Establish effectiveness of the corrective action and implement it.
- Verify that the corrective action has eliminated the problem.

Documentation of the problem is important to the system. A Corrective Action Request Form is filled out by the person finding the quality problem. This form identifies the problem, possible causes and the person responsible for action on the problem. The responsible person may be an analyst, field team leader, department QC coordinator or the QA Director. If no person is identified as responsible for action, the QA Director investigates the situation and determines who is responsible in each case.

The Corrective Action Request Form includes a description of the corrective action planned and the date it was taken, and space for follow-up. The QA Director checks to be sure that initial action has been taken and appears effective and, at an appropriate later date, checks again to see if the problem has been fully solved. The QA Director receives a copy of all Corrective Action Forms and then enters them in the Corrective Action Log. This permanent record aids the QA Director in follow-up and makes any quality problems visible to management; the log may also prove valuable in listing a similar problem and its solution.

13.0 Data Reduction, Validation and Data Reporting

Specific QC measures will be used to ensure the generation of reliable data from sampling and analysis activities. Proper collection and organization of accurate information followed by clear and concise reporting of the data is a primary goal in all such projects.

13.1 Field Data Reduction

Attachment A presents the standardized forms that will be used to record field sampling data. The Field Team Leader and the QAO will review the data collected from each train in its entirety in the field. Errors or discrepancies will be noted and dealt with accordingly. Both the Field Team Leader and the QAO have the authority to institute corrective actions in the field. Field data reduction (checking of valid isokinetic sampling rate and other sampling parameters) is done with a laptop computer using standardized Excel spreadsheets. **Attachment B** provides both setup and recovery schematics and a description of solutions and reagents to be used in each impinger train required for the overall program. All sample recovery sheets will be checked for completeness.

13.2 Laboratory Data Reduction

Analytical results will be reduced to appropriate units by the laboratory using the equations given in the applicable analytical method. Unless otherwise specified, results from the analysis of liquid waste feed samples for specific target constituents will be reported in units of mg/kg or % wt. Other parameters will be reported in standard units such as g/cc, Btu/lb, etc.

The laboratory typically reports results from the analysis of stack flue gas samples as total mass detected for the sample submitted. For those sample fractions where liquid impinger condensate is analyzed, the laboratory will measure the total liquid volume submitted and multiply by the measured concentrations of target analytes in these samples. The laboratories will report data as follows:

- Particulate matter – total mg collected in each sample train fraction (front-half rinse and filter)
- Metals – total µg collected in each sample train fraction
- PCDDs/PCDFs - total **pg** collected in each of the front-half and back-half sample train fractions
- HCl /Cl_2 – total µg collected in each sample train fraction as either HCl or Cl_2

Each LSC will be responsible for reviewing all results and calculations and verifying the completeness of the data set. The laboratory reports submitted by each laboratory will include the following deliverables:

- Transmittal letter listing all samples and analyses and a case narrative identifying any difficulties associated with the analyses and any anomalous QA/QC results
- Copies of Chain of Custody Forms

- Sample Report forms with sample field and laboratory identifier, dates of sample preparation and analysis, analytical results and detection limits
- Method Blank results
- MS and MSD results (as applicable)
- Replicate sample analyses (as applicable)
- Laboratory Control Sample results

Reports for organics in stack samples will include the following additional information:

- Surrogate recoveries
- Summary of initial calibrations
- Continuing calibration summaries
- Instrument tunes
- Data Validation

13.3 Data Validation

Data validation is the process of reviewing data and accepting, qualifying or rejecting it on the basis of method-specific criteria. The independent project QAO will use validation methods and criteria appropriate to the type of data and the purpose of the measurement. Records of all data will be maintained, even that judged to be an outlying or spurious value.

Field sampling data will be validated by the Field Team Leader based on a judgment of the representativeness of the sample, maintenance and cleanliness of sampling equipment and the adherence to an approved, written sample collection procedure.

Analytical data will be validated by the subcontractor laboratory QC or supervisory personnel using criteria outlined in their laboratory-specific QA Plan and/or written SOPs. Results from field and laboratory method blanks, replicate samples and internal QC samples will be used to further validate analytical results. Analytical results on field blanks and replicate field samples are valuable for validation of sample collection also. QC personnel will review all subcontractor laboratory raw analytical data to verify calculated results presented.

The following criteria will be used to evaluate the field sampling data:

- Use of approved test procedures
- Proper operation of the process being tested
- Use of properly operating and calibrated equipment
- Leak checks conducted before and after test runs
- Use of reagents that have conformed to QC specified criteria
- Use of NBS traceable CEMS calibration gases

- Proper chain-of-custody maintained
- All sample trains --check to ensure proper sample gas volume collected

The criteria used to evaluate the analytical data are as previously defined in Section 3.0 (data quality objectives) and the method-specific QA summary tables listed in Section 7.0.

13.4 Data Reporting

13.4.1 Preliminary Data Reporting in the Field

At the end of each day of testing, several types of data will be made available to all project participants and test observers. Recovery of each isokinetic sampling train will include spreadsheet calculations to determine proper isokinetic sampling rate, stack gas moisture content, temperature and flowrate and sample volume. These data will be reviewed for acceptability and made available to facility personnel and Agency staff.

13.4.2 Preliminary Reporting of Results

In the weeks following test conclusion, all field data will be reviewed and spreadsheet data entry will be checked for accuracy and completeness. As laboratory data become available, emission calculations will be performed and results will be provided to Norlite and Agency personnel. Most importantly, the results of any failed tests will be provided as soon as the data are thoroughly checked for accuracy and associated QC data are determined to be acceptable.

13.4.3 Final Data Report

The final report for this project will be a comprehensive data compilation that properly and logically documents and certifies all required test results. The report will include all of the required elements of a MACT NOC as outlined in Section 1.4.2 of the CPT Plan. AECOM plans to follow the guidance provided by EPA that defers to the suggested format as offered by the Louisiana Department of Environmental Quality (LDEQ) for a combined NOC and CPT report. As such, the report would be structured in a similar manner with sections delineated as follows:

- Summary of Test Results
- Introduction and Process Description
- Process Operating Conditions
- Feed Stream Sampling and Analysis
- Performance Test Results
- Quality Assurance / Quality Control Documentation
- Continuing Compliance Methods

Report appendices will also provide detailed supporting documentation as delineated in the above referenced LDEQ guidance. Appendices for the project report would include:

- Process Operating Data

- Field Sampling Documentation
- Sample Calculations
- Analytical Data Reports
- CMS / CEMS performance Evaluation Test Results

13.4.4 Management of Non-Detects

There are several different scenarios regarding the handling of analytical data reported as ND in this program. First, for the purposes of determining compliance with feed rate limits that are calculated from analytical data, the full ND value (reporting limit) will be used.

In general, the emission tables to be generated for the final report will perform all calculations using either a real value or the detection limit (i.e. reporting limit) for those parameters reported as ND. In essence, using the full detection limit in an emission calculation provides a worst-case assessment.

13.4.5 Oxygen Correction

In accordance with 63.1206(c)(2)(iii), the facility is required to identify a projected oxygen correction factor based on normal operations to be used during periods of startup and shutdown. Norlite does not presently envision the need to project any alternative correction factor. It should also be noted that all concentration-based emission results will be corrected to 7% oxygen in accordance with the MACT regulations.

13.4.6 Sampling Times and Calculation of Results

Stack gas concentrations for each applicable parameter will be calculated from laboratory results and field sampling data. The total weight of the analyte detected will be divided by the volume of gas sampled to provide emission concentrations. As stated above, all emission concentrations are further corrected to 7% oxygen for comparison to published standards.

13.4.7 Blank Correction

Expect for PM samples no others samples collected on this program are allowed to be blank-corrected. PM acetone blank correction will be employed as need as specified in the method.

13.4.8 Rounding and Significant Figures

For purposes of final data reporting, the procedures outlined under 40 CFR 63.1217(d) with respect to rounding of emission results and use of significant figures are proposed. This regulation notes that for all emission parameters except DRE, intermediate calculations must be performed using at least three significant figures, but that the resultant emission levels may be rounded to two significant figures to document compliance.

14.0 Quality Assurance Reports

14.1 Internal Reports

The Laboratory Services Coordinator will prepare a written report on QC activities associated with this project for the Quality Assurance Director. This report will detail the results of quality control procedures, problems encountered and any corrective action, which may have been required.

All Corrective Action Forms are submitted to the QA Officer for initial approval of the corrective action planned and a copy is provided to the Program Manager. All system audit reports are provided to the Program Manager and the Quality Assurance Officer.

14.2 Reports to Client

The final report will include a section summarizing QA/QC activities during the program. The Project Manager, Laboratory Services Coordinators and the QA Officer will participate in preparing this section. This section will provide summary QA/QC results for method blanks, surrogate spikes and laboratory control spike recoveries. This section will evaluate overall data quality in terms of accuracy, precision and completeness. Any discrepancies or difficulties noted in program work, protocol deviations or documentation gaps will be identified and discussed.

14.3 Regulatory Agency Notifications

NYSDEC will be notified for the purpose of their concurrence if there are any changes to the CPT plan or test methods. The agency will also be notified if any errors or discrepancies are discovered in the field data sheets upon review after returning from the field. Norlite will also notify NYSDEC at least 60 calendar days before the test is scheduled to begin.

ATTACHMENT A

Example Field Data Sheets

ATTACHMENT A

Example Field Data Sheets

AECOM

Field Log

Date	Time	Description of Events and Activities

AECOM

NOZZLE CALIBRATION FORM

Client: _____ Project #: _____

Date: _____ Calibrated by: _____

Nozzle ID #	D_1, in.	D_2, in.	D_3, in.	Delta D, in.	D_{avg}, in.

Where:

$D_{1,2,3}$ = Nozzle diameter measured on a different diameter to the nearest 0.001 in.

Delta D = Maximum difference between any two measurements, in.
Tolerance = 0.004 in.

D_{avg} = Average of $D_{1,2,3}$

AECOM

METHOD 2 GAS VELOCITY AND VOLUME DATA SHEET

Facility : _____ Port Length: _____ Monorail ? _____ Platform Width _____

Date : _____ Port Diam.: _____ Y or N Railing Ht. : _____

Operator(s) : _____

Stack Diameter (in.) : _____

Bar. Press. (in. Hg) : _____

Static Press. (in. H_2O) _____

Cp : 0.84 or 0.99 (Circle one)

O_2 (%) _____

CO_2 (%) _____

Wet Bulb Temp. (°F) : _____

Dry Bulb Temp. (°F) : _____

SCHEMATIC OF STACK CROSS SECTION

Pt. #	Pos. (in.)	Vel. DP (in. H_2O)	Stack Temp. (°F)	Flow Angle that Yields a Null DP		Pt. #	Pos. (in.)	Vel. DP (in. H_2O)	Stack Temp. (°F)	Flow Angle that Yields a Null DP

AECOM

EPA ISOKINETIC SAMPLING - FIELD DATA SHEET

Sampling Train ______________________
Run Number ______________________
Client ______________________
Facility Location ______________________
Source ______________________
Date ______________________
Operator ______________________
Stack Dia. - in. ______________________
Start Time ______________________
Stop Time ______________________

Barometric Pressure ______________
Static Pressure (+/-) ______________
Probe/Pitot Number ______________
Pitot Coefficient ______________
Filter Box No. ______________
Meter Box No. ______________
Orifice Coefficient (Y) ______________
Delta H @ ______________
Nozzle Size/No. ______________
XAD Thermocouple ID: ______________
Imp Outlet TC ID:

LEAK CHECKS in "Hg

INITIAL VAC. ________ in. CFM ________
MID VAC. ________ in. CFM ________
FINAL VAC. ________ in. CFM ________
\+ - \+ -
INIT. PITOT ________ FINAL PITOT ________

FILTER DATA

NUMBER	TARE

IMPINGER VOL'S.		
INIT.	FINAL	RINSE
SILICA GEL		

Orsat	
CO2	O2

Final Purge Rate ______________
Final PH

SAMPLE POINT	CLOCK TIME	VELOCITY HEAD DeltaP, in wc	ORIFICE METER VOL. DeltaH, in wc	GAS METER VOLUME ft³	TEMPERATURE READINGS, °F							PUMP VACUUM in. Hg	COMMENTS
					STACK	PROBE	OVEN	ORGANIC MODULE	IMPINGER	GAS METER IN	GAS METER OUT		

AECOM

VOST DATA SHEET

PROJECT NO.	**DATE**
CLIENT	**OPERATOR**
FACILITY	**BAR. PRESSURE, in. Hg**
SOURCE	**PROBE LENGTH (ft)**
SAMPLING LOCATION Exhaust Stack	**DESIRED PROBE TEMP.**
METER CALIBRATION FACTOR (Y)	**PROBE PURGED ?**
DRY GAS METER NO.	**DESIRED FLOW RATE (Lpm)**
RUN NO.	**DESIRED SAMPLE VOLUME (dsL)**
SORBENT TUBE NO'S.	**DGM PRESSURE, in. H_2O**
Train Leak Check -- INITIAL VACUUM (in. Hg):	**Leak Rate :** **in. Hg in 60 sec.**
Train Leak Check -- FINAL VACUUM (in. Hg):	**Leak Rate :** **in. Hg in 60 sec.**

ACCEPTANCE CRITERIA : Leak Rate < 2.5 mm Hg (0.1 in. Hg) after 60 sec.

SAMPLING TIME (min)	CLOCK TIME (24-hr)	FLOW RATE (Lpm)	GAS METER READING (L)	TEMPERATURE READINGS			PUMP VAC. (in. Hg)
				PROBE (°C or °F)	DRY GAS METER (°C or °F)	TRAP (°C or °F)	

COMMENTS :

Laboratory Lot #:

AECOM

SOLID/LIQUID GRAB SAMPLING FIELD DATA SHEET

AECOM Project No.

Client: **Facility:** Cohoes, NY

Stream Sampled: Liquid Low-Grade Fuel (LLGF)

Sampling Location:

Date:		**Date:**		**Date:**	
Condition:		**Condition:**		**Condition:**	
Run No.		**Run No.**		**Run No.**	
Start Time:		**Start Time:**		**Start Time:**	
Stop Time:		**Stop Time:**		**Stop Time:**	
Grab Interval (min)	Clock Time (actual)	Grab Interval (min)	Clock Time (actual)	Grab Interval (min)	Clock Time (actual)
0		0		0	
15		15		15	
30		30		30	
45		45		45	
60		60		60	
75		75		75	
90		90		90	
105		105		105	
120		120		120	
135		135		135	
150		150		150	
165		165		165	
180		180		180	
195		195		195	
210		210		210	
225		225		225	
240		240		240	

Comments :

Signature of Sampler:

AECOM

SOLID/LIQUID GRAB SAMPLING FIELD DATA SHEET

AECOM Project No.

Client: **Facility:** **Cohoes, NY**

Stream Sampled: **Shale**

Sampling Location:

Date:		**Date:**		**Date:**	
Condition:		**Condition:**		**Condition:**	
Run No.		**Run No.**		**Run No.**	
Start Time:		**Start Time:**		**Start Time:**	
Stop Time:		**Stop Time:**		**Stop Time:**	
Grab Interval	Clock Time (actual)	Grab Interval	Clock Time (actual)	Grab Interval	Clock Time (actual)
Beginning		Beginning		Beginning	
Middle		Middle		Middle	
End		End		End	

Comments :

Signature of Sampler:

ATTACHMENT B

Isokinetic Sampling Train Setup and Recovery Schematics

AECOM

SAMPLE TRAIN MOISTURE RECOVERY DATA SHEET

Reference Method / Sampling Train :											
Recovered by :				**Recovered by :**				**Recovered by :**			
Run No.		**Date :**		**Run No.**		**Date :**		**Run No.**		**Date :**	
XAD Module No. :		**N/A**		**XAD Module No. :**		**N/A**		**XAD Module No. :**		**N/A**	
Filter # : Teflon		**Tare:**		**Filter # : Teflon**		**Tare:**		**Filter # : Teflon**		**Tare:**	
Impinger No. and Volume				**Impinger No. and Volume**				**Impinger No. and Volume**			
No.	Initial (mL)	Final (mL)	Rinse (mL)	No.	Initial (mL)	Final (mL)	Rinse (mL)	No.	Initial (mL)	Final (mL)	Rinse (mL)
1	**100**			1	**100**			1	**100**		
2	**100**			2	**100**			2	**100**		
3	**0**			3	**0**			3	**0**		
4	**100**			4	**100**			4	**100**		
5	**100**			5	**100**			5	**100**		
6	**SG**			6	**SG**			6	**SG**		
7				7				7			
			DIFF :				**DIFF :**				**DIFF :**
Totals	**400**			**Totals**	**400**			**Totals**	**400**		
	Initial (g)	Final (g)	**DIFF :**		Initial (g)	Final (g)	**DIFF :**		Initial (g)	Final (g)	**DIFF :**
Silica Gel				Silica Gel				Silica Gel			
Final Net Moisture Gain:				**Final Net Moisture Gain:**				**Final Net Moisture Gain:**			

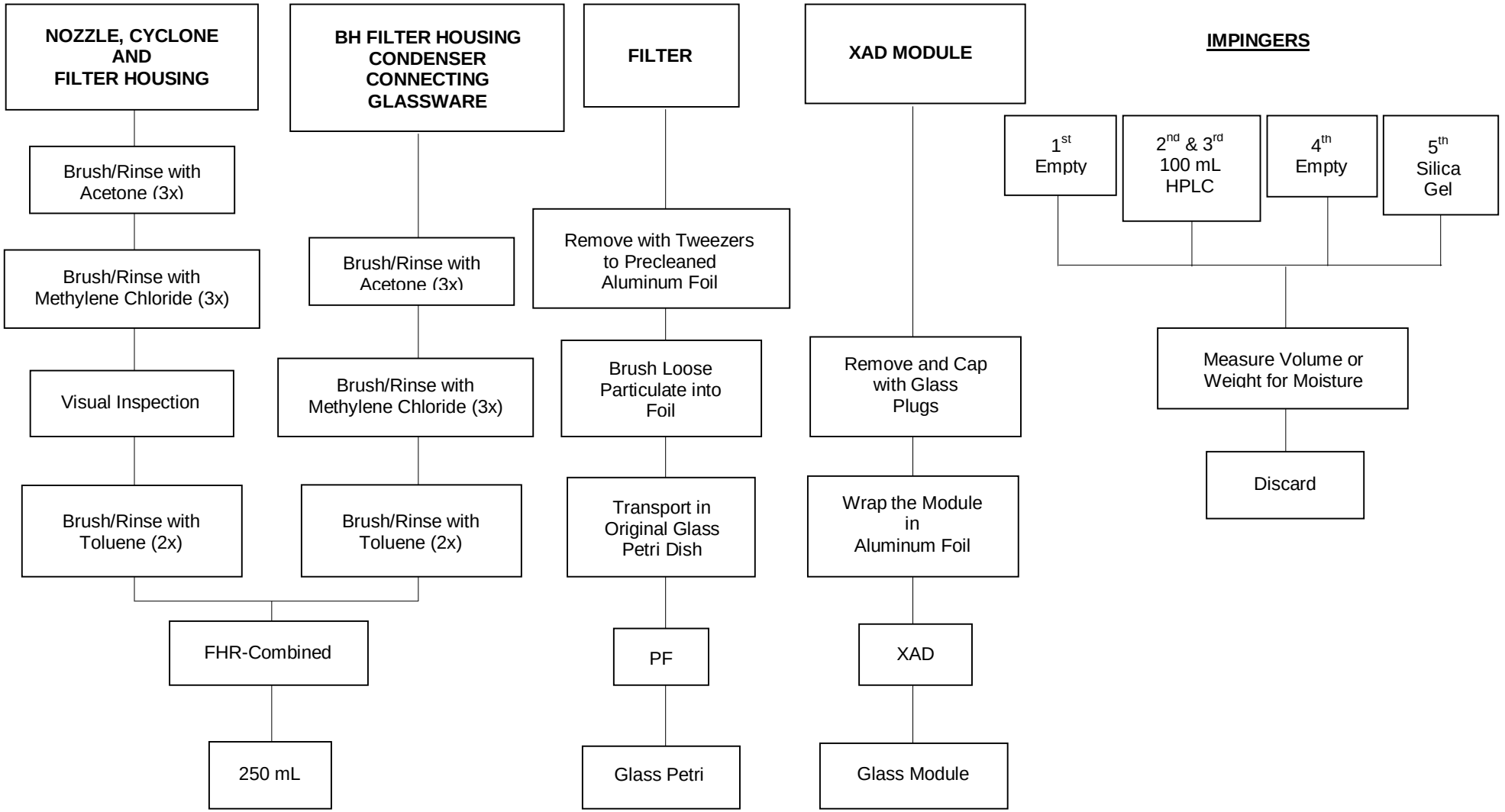
SAMPLE TRAIN SETUP
PCDDs / PCDFs
(as Per EPA Method 0023A)

IMPINGERS --

1st	--	empty
2nd	--	100 mL HPLC Water
3rd	--	100 mL HPLC Water
4th	--	empty
5th	--	Silica Gel

FIELD BLANKS -- (No Volumes Specified in Methods)

FH/BH Rinse	--	~ 50 mL Acetone ~ 50 mL Methylene Chloride ~ 50 mL Toluene
Filter	--	One Unused Filter
XAD Trap	--	One Unused XAD Trap



M0023A RECOVERY SCHEMATIC

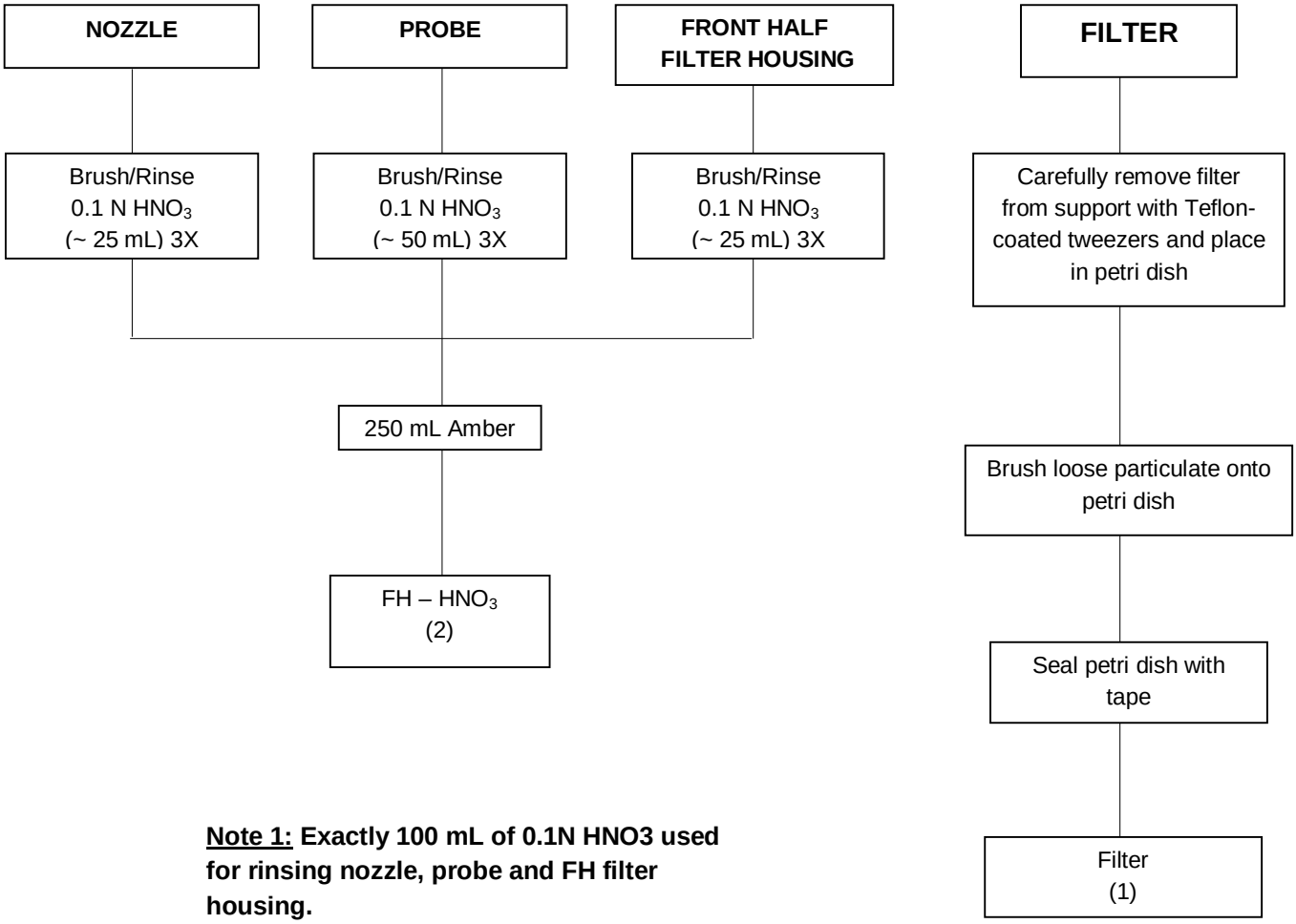
SAMPLE TRAIN SETUP
MULTIMETALS
(as Per EPA Method 29)

IMPINGERS --

1st	--	100 mL 5% HNO_3 / 10% H_2O_2
2nd	--	100 mL 5% HNO_3 / 10% H_2O_2
3rd	--	empty
4th	--	100 mL 10% H_2SO_4 / 4% $KMnO_4$
5th	--	100 mL 10% H_2SO_4 / 4% $KMnO_4$
6th		Silica Gel

FIELD BLANKS -- (Exact Volumes Specified by Method)

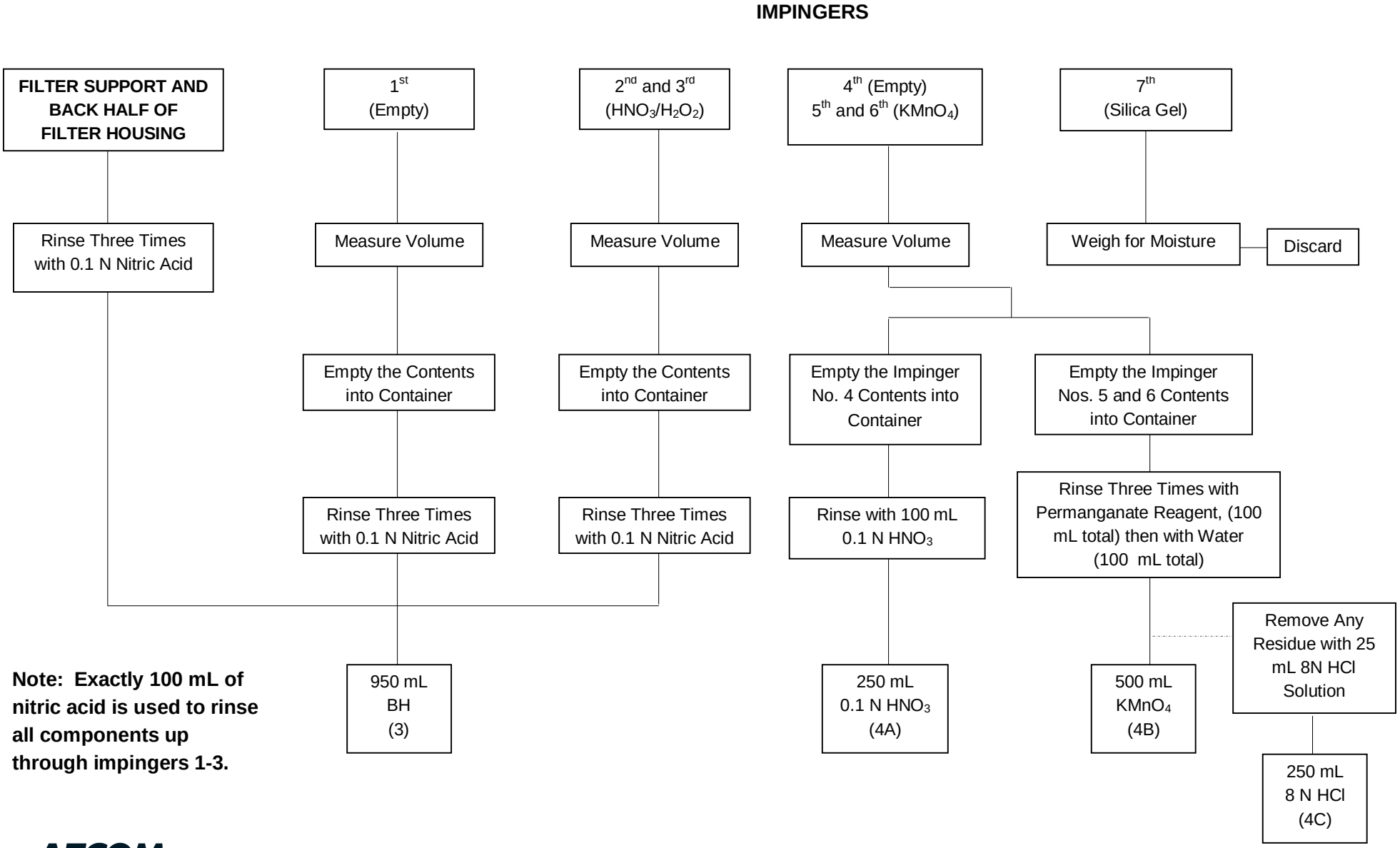
0.1 N HNO3	--	300 mL
5% HNO_3 / 10% H_2O_2	--	200 mL
10% H_2SO_4 / 4% $KMnO_4$	--	100 mL
DI Water	--	100 mL
8 N HCl	--	25 mL (added to 200 mL water)
Filter	--	One unused filter



Note 1: **Exactly 100 mL of 0.1N HNO3 used for rinsing nozzle, probe and FH filter housing.**

Note 2: **Nozzle, probe and FH filter housing are rinsed with water followed by acetone after the nitric acid rinse. The water and acetone are then discarded.**

METHOD 29 (METALS) RECOVERY SCHEMATIC – FRONT HALF RECOVERY



Note: Exactly 100 mL of nitric acid is used to rinse all components up through impingers 1-3.

AECOM

METHOD 29 (METALS) RECOVERY SCHEMATIC – BACK HALF RECOVERY

AECOM

MULTIMETALS SAMPLING (BIF METHOD)

Field Blanks retained for analysis:

- 0.1 N HNO_3 – 300 mL
- 5% HNO_3 / 10% H_2O_2 – 200 mL
- 4% $KMnO_4$ / 10% H_2SO_4 – 100 mL
- 8N HCl – 25 mL into 200 mL H_2O
- DI Water ~ 100 mL

Other Notes for M29 Metals Train:

- Acidified $KMnO_4$ to be stored in glass bottles to prevent degradation
- Probe, nozzle and FH filter housing to be rinsed with water followed by acetone after the 0.1 N HNO_3 rinse. The water and acetone are discarded.
- Venting of containers used for permanganate solution is required.
- Exactly 100 mL of 0.1 N HNO_3 is used for nozzle, probe and FH filter housing.*
- Exactly 100 mL of 0.1 N HNO_3 is used for filter support, BH filter housing and impingers 1-3 and connecting glassware.
- Container 5A: Contents of empty 4th impinger rinsed with exactly 100 mL of 0.1 N HNO_3.
- Container 5B: Contents of 5th and 6th impingers (acid. $KMnO_4$) rinsed with 100 mL acid. permanganate followed by 100 mL water.
- Container 5C: necessary only if visible deposits remain in impingers 5 and 6. Rinse impinger 5 with 25 mL 8N HCl and then pour into impinger 6 and rinse. Then pour into sample bottle already containing 200 mL H_2O.

* Use ~75 mL for probe & nozzle, ~25 mL for FH filter housing.

Sample Bottle Requirements:

Per Run	Total Bottles for 3 Runs + 1 Field Blank
1-950-mL (Impingers 1-2)	3-950-mL
1-250-mL (Front Half Rinse)	4-500-mL
1-250-mL (Impinger 3)	13-250-mL
1-500-mL (Impingers 4-5)	
1-250-mL (HCl Rinse)	

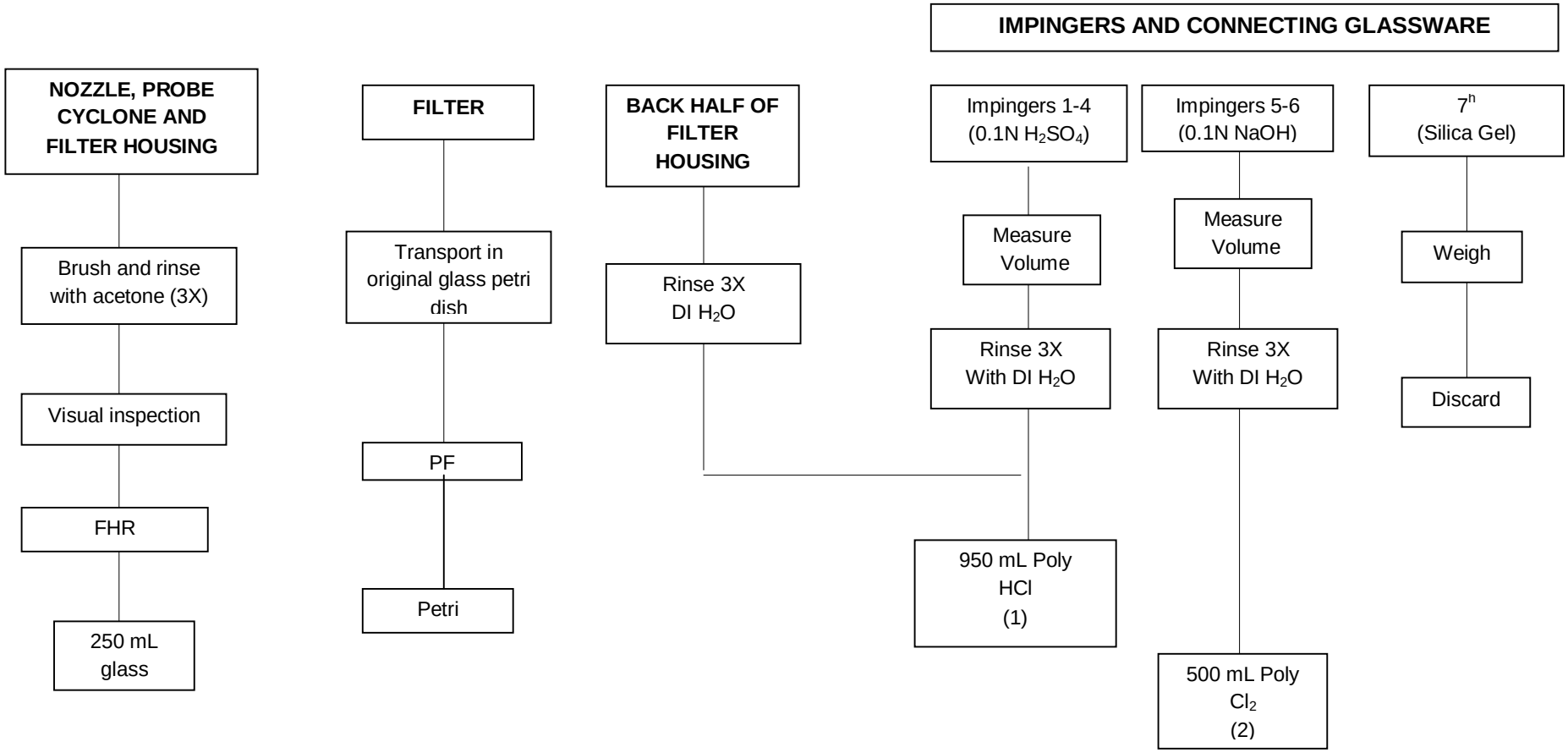
SAMPLE TRAIN SETUP
Hydrogen Chloride and Chlorine (HCl / Cl_2)
(as Per EPA Method 26A)

IMPINGERS --

1st	--	100 mL 0.1N H_2SO_4
2nd	--	100 mL 0.1N H_2SO_4
3rd	--	empty
4th	--	100 mL 0.1 N NaOH
5th	--	100 mL 0.1 N NaOH
6th		Silica Gel

FIELD BLANKS -- (Volumes Specified by Method)

0.1N H_2SO_4	--	200 mL
0.1 N NaOH	--	200 mL
DI Water	--	~ 200 mL



METHOD 26A (PM / HCl / Cl_2) RECOVERY SCHEMATIC

Appendix B

Continuous Monitoring System Performance Evaluation Test Plan

Continuous Monitoring System (CMS)
Performance Evaluation Test (PET) Plan

CMS PET Plan

Norlite LLC – Cohoes, NY
MACT CPT Plan 2017

Contents

1.0 Introduction

As part of complying with the requirements of the hazardous waste combustor (HWC) maximum achievable control technology (MACT) regulations, facilities must submit a plan along with the comprehensive performance test (CPT) Plan and perform an evaluation of their "Continuous Monitoring System" (CMS) as part of the CPT. EPA defines the CMS in 40 CFR 63.2:

> "Continuous Monitoring System (CMS) is a comprehensive term that may include, but is not limited to, continuous emission monitoring systems, continuous opacity monitoring systems, continuous parameter monitoring systems, or other manual or automatic monitoring that is used for demonstrating compliance with an applicable regulation on a continuous basis as defined by the regulation."

Based on the above definition, the main components of the CMS for the Norlite combustion units include the following:

- Process instruments that monitor or control key process parameters, including the Unit's Continuous Emissions Monitoring system;
- The Distributive Control System (DCS) using a programmable logic controller (PLC) and Data Acquisition System (or DAS); and
- The automatic waste feed cutoff (AWFCO) system.

The CMS Performance Evaluation Test Plan utilizes a combination of activities to accomplish its objective, which is to verify that the combustion system is properly controlled and that the equipment and systems that are used are operating properly and are accurate. These activities include instrument audits or calibrations, auditing the function of the AWFCO system and the DCS. This plan describes the CMS itself, the procedures and documentation practices that will be used to verify the functionality of the CMS and the Quality Assurance requirements of the evaluation. The reader is referred to Norlite's CMS QC Program Plan dated January 12, 2016 for a more in-depth discussion of the overall CMS QC program.

2.0 Continuous Monitoring System Description

This section provides an overview of the key components of the CMS. This CMS evaluation includes field instrumentation, the DCS/DAS, and field control (e.g., control and block valves).

2.1 Field Instrumentation

Section 2.0 (Tables 2-2 and 2-3) and Section 4.0 (Tables 4-1, 4-2 and 4-3) of this Plan provide information pertaining to field instruments and/or parameters to be monitored that are part of the overall CMS. These instruments monitor and control certain process operations to assure the unit is operating safely and in compliance with applicable environmental requirements. The instruments used for these aspects of process control meet the definition of "Continuous Monitor" in 40 CFR 63.1201.

As part of initial instrument specification prior to installation and use in the process, instrument audit and calibration procedures are identified or developed. These procedures specify the frequency of auditing the instrument's function and accuracy and the actual procedure for verification. These procedures specify both the specific steps and the acceptable accuracy requirements that the instrument must meet to "pass". Troubleshooting procedures are typically included to help plant personnel correct any problems and get the instruments operational.

2.2 Continuous Emission Monitoring System

In addition to other field instrumentation, the operation of the incinerator also relies on its Continuous Emission Monitoring System (CEMS) to monitor stack emissions concentrations. This system is described in Section 4.6. When emission levels deviate from allowable limits, the DCS takes appropriate action up to and including initiating an AWFCO.

2.3 Process Control

The process control systems for Norlite's LWAKs are described in Sections 2.0 and 4.5 of this Plan. These systems detect signals from process instruments; perform calculations according to the programmable logic; adjust control equipment; and notify operators when key process parameters deviate outside acceptable limits. In addition to notifying operating personnel, the AWFCO system described in Section 4.5.2 will automatically shut down the waste feeds and the overall process itself in the event of deviations outside acceptable operating limits.

2.4 CMS Operation

All the components of the CMS must be operational for the incinerator to burn waste. The DCS and overall process control system are designed in such a manner as to continually verify CMS operability while the unit is running. Field instrumentation (both sensing and control) are connected to the DCS in "control loops" with common wiring, electrical signal transmitters, input/output devices and related programmable logic. All components of each control loop related to the feeding of waste must be operating for the kiln to be enabled to burn waste. The programmable logic is designed in such a way that it can sense and verify that various components of the process and the process itself are operating as required. A complete listing of current AWFCO limits was provided previously in **Table 4-1**.

2.5 Management of Change

A Management of Change (MOC) procedure is implemented at Norlite to ensure that adequate levels of communication exist between all departments when changes are made which affect the process. A change made in one part of the process or other processes may have unintended effects on other parts of the process because the stationary sources are an integrated system. These proposed changes are therefore appropriately scrutinized before they are made to ensure the changes do not compromise the safety and integrity of the process and avoid adverse effects or worker and public safety and the environment.

The MOC evaluation procedure includes changes which impact:

- Process chemicals;
- Technology;
- Equipment;
- Procedures; and
- Employees.

This procedure does not apply to "replacement in kind" which is defined as replacements that satisfy the design specifications. Each type of change requires the appropriate authorization to proceed with the change. Personnel (e.g., engineering, operations, and safety) assess the potential impact of the change on safety and health. The MOC procedure allows for documentation of changes, employee training and education and an assessment of regulatory requirements for the changes.

3.0 CMS Performance Evaluation Test Plan

As previously described, the CMS Performance Evaluation Test Plan relies on a combination of activities to determine whether the CMS is functioning properly. This will include the following:

- Auditing the instrument maintenance and calibration program;
- Auditing all calculations built into the operating parameter limit (OPL) tracking and recording process
- Calibrating field instruments; and
- Auditing the AWFCO Testing Program.

Norlite personnel who are knowledgeable of facility operations, their process control systems and relevant regulatory requirements, will perform these activities.

3.1 Instrument Audit and Calibration

As part of conducting the CMS Performance Evaluation, a two step process will be used to assess the status of the various field instruments identified in Sections 2.0 and 4.0. First, audit/calibration records will be reviewed for these instruments to determine when their most recent audit/calibration occurred. From this review, any instruments that are approaching the end of their audit/calibration cycle will be scheduled for audit and/or calibration prior to performing the actual CPT.

Because certain instruments cannot be audited or calibrated without taking the unit offline, these will be scheduled over a period of time prior to the test program to minimize process interruptions and shutdowns. All instruments requiring pre-test audits/calibrations will be evaluated prior to field program implementation.

3.2 AWFCO System Performance Evaluation

Another component of the CMS Performance Evaluation is auditing the AWFCO system and related DCS logic. This will be accomplished by reviewing the last year of AWFCO testing logs to assess whether there are any recurring problems with the AWFCO system. Any incidence of problems with the AWFCO system will be identified for follow-up and correction prior to testing.

This evaluation will also include examining the appropriate programmable logic statements to compare the AWFCO set-points with the applicable operating parameter limits to assure that these are appropriate.

3.3 Auditing the CEM System

The CEMS used on Norlite's LWAKs are installed, operated and maintained to comply with the provisions of 40 CFR 63, Subpart EEE, Performance Specification 4B. In general, this means that the individual analyzers are calibrated daily (zero/span), quarterly (gas audits) and annually (relative accuracy test audits). Thus, the evaluation of the performance of this system will be done as part of meeting those requirements and a separate evaluation will not be conducted under this plan.

3.4 Schedule

The Performance Evaluation itself will be conducted from one to three months prior to a CPT or Confirmatory Test as required by the HWC MACT regulations. All CMS Performance Evaluation activities will be completed with all components meeting their respective accuracy requirements prior to performing the CPT.

3.5 Reporting and Documentation

The results of the CMS Performance Evaluation will be included as part of the Final Notification of Compliance (NOC) as required by 40 CFR 63.9(h)(2). This will include the following information:

- Description of the CMS components;
- Description of the CMS Performance Evaluation Plan;
- Listing of all field instruments that are part of the CMS and their audit/calibration status;
- Listing of field instruments that have been specifically audited/calibrated as part of the CMS Performance Evaluation;
- Copies of the most recent audit/calibration results for CMS instruments;
- AWFCO system evaluation results;
- CEM system evaluation results; and
- Copies of relevant programmable logic statements showing where calculations and regulatory alarms and set-points are used in the coding to assure compliance.

4.0 Quality Assurance

The quality assurance requirements for this Performance Evaluation are specified in the table below. The QA requirements for CMS equipment components are established by other criteria outside this Performance Evaluation.

Table 4-1 Quality Assurance for CMS Performance Evaluation

CMS Component	Basis for QA Requirement	QA Specification
Field Instruments	Manufacturer recommendations	Audit/calibration meets recommended specifications for all affected instruments
AWFCO System Evaluation	RCRA permit and MACT requirements	No failures of the AWFCO system
CEM System	40 CFR 60, Appendices A, B and F and Appendix to Subpart EEE	Meets those specifications
Programmable Logic	RCRA Permit and MACT requirements	All set points programmed correctly

Appendix C

Analytical Laboratory Certifications

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

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Issued April 01, 2017

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. PAUL BATISTA
ADIRONDACK ENVIRONMENTAL SERVICES INC
314 NORTH PEARL STREET
ALBANY, NY 12207

NY Lab Id No: 10709

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES AIR AND EMISSIONS
All approved analytes are listed below:

Fuels	
B.T.U.	ASTM D2015-77
Percent Sulfur	ASTM D4294
Metals II	
Beryllium, Total	NIOSH 7300
Mercury, Total	NIOSH 6009
Metals III	
Chromium, Total	NIOSH 7300
Surface Coating	
Density	ASTM D1475-60
Percent Water	EPA 24
Volatile Content	EPA 24
	ASTM D2369-81

Serial No.: 55736

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ACCREDITATION BODY

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NY Lab Id No: 10709

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES AIR AND EMISSIONS
All approved subcategories and/or analytes are listed below:

Metals I	
Lead, Total	NIOSH 7300
Miscellaneous	
Asbestos	40 CFR 763 APX A No. III
	YAMATE,AGARWAL GIBB
	NIOSH 7402
Fibers	NIOSH 7400 A RULES
Sample Preparation Methods	
	40 CFR PART 50 APP G

Serial No.: 55737

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NY Lab Id No: 10709

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ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:

Miscellaneous

Asbestos in Friable Material	Item 198.1 of Manual
	EPA 600/M4/82/020
Asbestos in Non-Friable Material-PLM	Item 198.6 of Manual (NOB by PLM)
Asbestos in Non-Friable Material-TEM	Item 198.4 of Manual
Lead in Paint	EPA 6010C

Sample Preparation Methods

EPA 3050B

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All approved analytes are listed below:

Acrylates	
Acrolein (Propenal)	EPA 8260C
	EPA 624
Acrylonitrile	EPA 8260C
	EPA 624
Ethyl methacrylate	EPA 8260C
Methyl acrylonitrile	EPA 8260C
Methyl methacrylate	EPA 8260C
Amines	
1,2-Diphenylhydrazine	EPA 8270D
1,4-Phenylenediamine	EPA 8270D
1-Naphthylamine	EPA 8270D
2-Naphthylamine	EPA 8270D
2-Nitroaniline	EPA 8270D
3-Nitroaniline	EPA 8270D
4,4'-Methylenebis(2-chloroaniline)	EPA 8270D
4-Chloroaniline	EPA 8270D
4-Nitroaniline	EPA 8270D
5-Nitro-o-toluidine	EPA 8270D
a,a-Dimethylphenethylamine	EPA 8270D
Aniline	EPA 8270D
Carbazole	EPA 8270D
Diphenylamine	EPA 8270D
Methapyrilene	EPA 8270D
Pronamide	EPA 8270D
Pyridine	EPA 8270D

Benzidines	
3,3'-Dichlorobenzidine	EPA 625
	EPA 8270D
3,3'-Dimethylbenzidine	EPA 8270D
Benzidine	EPA 625
	EPA 8270D
Carbamate Pesticides	
Carbofuran	EPA 632
Chlorinated Hydrocarbon Pesticides	
4,4'-DDD	EPA 8081B
	EPA 608
4,4'-DDE	EPA 8081B
	EPA 608
4,4'-DDT	EPA 8081B
	EPA 608
Aldrin	EPA 8081B
	EPA 608
alpha-BHC	EPA 8081B
	EPA 608
alpha-Chlordane	EPA 8081B
beta-BHC	EPA 8081B
	EPA 608
Captan	EPA 8270D
Chlordane Total	EPA 8081B
	EPA 608
Chlorobenzilate	EPA 8270D

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Chlorinated Hydrocarbon Pesticides	
delta-BHC	EPA 8081B
	EPA 608
Diallate	EPA 8270D
Dieldrin	EPA 8081B
	EPA 608
Endosulfan I	EPA 8081B
	EPA 608
Endosulfan II	EPA 8081B
	EPA 608
Endosulfan sulfate	EPA 8081B
	EPA 608
Endrin	EPA 8081B
	EPA 608
Endrin aldehyde	EPA 8081B
	EPA 608
Endrin Ketone	EPA 8081B
gamma-Chlordane	EPA 8081B
Heptachlor	EPA 8081B
	EPA 608
Heptachlor epoxide	EPA 8081B
	EPA 608
Isodrin	EPA 8270D
Kepone	EPA 8270D
Lindane	EPA 8081B
	EPA 608
Methoxychlor	EPA 8081B

Chlorinated Hydrocarbon Pesticides	
Methoxychlor	EPA 608
Mirex	EPA 8081B
Toxaphene	EPA 8081B
	EPA 608
Chlorinated Hydrocarbons	
1,2,3-Trichlorobenzene	EPA 8260C
1,2,4,5-Tetrachlorobenzene	EPA 8270D
1,2,4-Trichlorobenzene	EPA 625
	EPA 612
	EPA 8270D
1-Chloronaphthalene	EPA 8270D
2-Chloronaphthalene	EPA 625
	EPA 8270D
Hexachlorobenzene	EPA 625
	EPA 8270D
Hexachlorobutadiene	EPA 625
	EPA 8270D
Hexachlorocyclopentadiene	EPA 625
	EPA 8270D
Hexachloroethane	EPA 625
	EPA 8270D
Hexachloropropene	EPA 8270D
Pentachlorobenzene	EPA 8270D
Chlorophenoxy Acid Pesticides	
2,4,5-T	EPA 8321B

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All approved analytes are listed below:

Chlorophenoxy Acid Pesticides	
2,4,5-TP (Silvex)	EPA 8321B
2,4-D	EPA 8321B
Demand	
Biochemical Oxygen Demand	SM 5210B-01,-11
Carbonaceous BOD	SM 5210B-01,-11
Chemical Oxygen Demand	EPA 410.4 Rev. 2.0
Fuel Oxygenates	
Ethanol	EPA 8260C
	EPA 8015D
Methyl tert-butyl ether	EPA 8260C
tert-amyl methyl ether (TAME)	EPA 8260C
tert-butyl alcohol	EPA 8260C
Haloethers	
2,2'-Oxybis(1-chloropropane)	EPA 625
	EPA 8270D
4-Bromophenylphenyl ether	EPA 625
	EPA 8270D
4-Chlorophenylphenyl ether	EPA 625
	EPA 8270D
Bis(2-chloroethoxy)methane	EPA 625
	EPA 8270D
Bis(2-chloroethyl)ether	EPA 625
	EPA 8270D

Metals I	
Barium, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
Cadmium, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
Calcium, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
Chromium, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
Copper, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
Iron, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
Lead, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
	EPA 200.9 Rev. 2.2
Magnesium, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
Manganese, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
Nickel, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
Potassium, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
Silver, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
Sodium, Total	EPA 200.7 Rev. 4.4

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Metals I	
Sodium, Total	EPA 6010C
Strontium, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
Metals II	
Aluminum, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
Antimony, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
Arsenic, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
	SM 3113B-04
Beryllium, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
Chromium VI	EPA 7196A
	SM 3500-Cr B-09,-11
Mercury, Low Level	EPA 1631E
Mercury, Total	EPA 245.1 Rev. 3.0
	EPA 7470A
Selenium, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
Vanadium, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
Zinc, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
Metals III	
Cobalt, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
Gold, Total	EPA 200.7 Rev. 4.4
Molybdenum, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
Thallium, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
	EPA 200.9 Rev. 2.2
Tin, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
Titanium, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
Mineral	
Acidity	SM 2310B-97,-11
Alkalinity	SM 2320B-97,-11
Calcium Hardness	EPA 200.7 Rev. 4.4
Chloride	EPA 300.0 Rev. 2.1
	SM 4500-Cl- C-97,-11
Fluoride, Total	EPA 300.0 Rev. 2.1
Hardness, Total	EPA 200.7 Rev. 4.4
Sulfate (as SO4)	EPA 300.0 Rev. 2.1
Miscellaneous	
Boron, Total	EPA 200.7 Rev. 4.4
	EPA 6010C
Bromide	EPA 300.0 Rev. 2.1

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WADSWORTH CENTER

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Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. PAUL BATISTA
ADIRONDACK ENVIRONMENTAL SERVICES INC
314 NORTH PEARL STREET
ALBANY, NY 12207

NY Lab Id No: 10709

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All approved analytes are listed below:

Miscellaneous	
Color	SM 2120B-01,-11
Corrosivity	SM 2330
Cyanide, Total	SM 4500-CN E-99,-11
	EPA 335.4 Rev. 1.0
Formaldehyde	EPA 8315A
Oil and Grease Total Recoverable (HEM)	EPA 1664A
Organic Carbon, Total	SM 5310C-00,-11
Phenols	EPA 420.1 Rev. 1978
Specific Conductance	EPA 120.1 Rev. 1982
	SM 2510B-97,-11
Sulfide (as S)	EPA 9034
	SM 4500-S2- D-00,-11
Surfactant (MBAS)	SM 5540C-00,-11
Total Petroleum Hydrocarbons	EPA 1664A
Turbidity	SM 2130 B-01,-11
	EPA 180.1 Rev. 2.0

Nitroaromatics and Isophorone	
1,3,5-Trinitrobenzene	EPA 8270D
1,3-Dinitrobenzene	EPA 8270D
1,4-Naphthoquinone	EPA 8270D
2,4-Dinitrotoluene	EPA 625
	EPA 8270D
2,6-Dinitrotoluene	EPA 625
	EPA 8270D
4-Nitroquinoline-1-oxide	EPA 8270D

Nitroaromatics and Isophorone	
Isophorone	EPA 625
	EPA 8270D
Nitrobenzene	EPA 625
	EPA 8270D

Nitrosoamines	
N-Nitrosodiethylamine	EPA 8270D
N-Nitrosodimethylamine	EPA 625
	EPA 8270D
N-Nitrosodi-n-butylamine	EPA 8270D
N-Nitrosodi-n-propylamine	EPA 625
	EPA 8270D
N-Nitrosodiphenylamine	EPA 625
	EPA 8270D
N-nitrosomethylethylamine	EPA 8270D
N-nitrosomorpholine	EPA 8270D
N-nitrosopiperidine	EPA 8270D
N-Nitrosopyrrolidine	EPA 8270D

Nutrient	
Ammonia (as N)	SM 4500-NH3 G-97,-11
	SM 4500-NH3 C-97,-11
	EPA 350.1 Rev. 2.0
Kjeldahl Nitrogen, Total	SM 4500-NH3 C-97,-11
Nitrate (as N)	EPA 300.0 Rev. 2.1
	SM 4500-NO3 F-00,-11
Nitrate-Nitrite (as N)	SM 4500-NO3 F-00,-11

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Nutrient	
Nitrite (as N)	EPA 300.0 Rev. 2.1
	SM 4500-NO2 B-00,-11
Orthophosphate (as P)	EPA 300.0 Rev. 2.1
	SM 4500-P E-99,-11
Phosphorus, Total	SM 4500-P E-99,-11
Organophosphate Pesticides	
Atrazine	EPA 8141B
Azinphos methyl	EPA 8141B
Chlorpyriphos	EPA 8141B
Diazinon	EPA 8141B
Dimethoate	EPA 8141B
Disulfoton	EPA 8141B
Famphur	EPA 8141B
Malathion	EPA 8141B
Parathion ethyl	EPA 8141B
Parathion methyl	EPA 8141B
Pendimethalin	EPA 8141B
Phorate	EPA 8141B
Simazine	EPA 8141B
Sulfotepp	EPA 8141B
Thionazin	EPA 8141B
Phthalate Esters	
Benzyl butyl phthalate	EPA 625
	EPA 606
	EPA 8270D

Phthalate Esters	
Bis(2-ethylhexyl) phthalate	EPA 625
	EPA 606
	EPA 8270D
Diethyl phthalate	EPA 625
	EPA 606
	EPA 8270D
Dimethyl phthalate	EPA 625
	EPA 606
	EPA 8270D
Di-n-butyl phthalate	EPA 625
	EPA 606
	EPA 8270D
Di-n-octyl phthalate	EPA 625
	EPA 606
	EPA 8270D
Polychlorinated Biphenyls	
PCB-1016	EPA 8082A
	EPA 608
PCB-1221	EPA 8082A
	EPA 608
PCB-1232	EPA 8082A
	EPA 608
PCB-1242	EPA 8082A
	EPA 608
PCB-1248	EPA 8082A

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Polychlorinated Biphenyls	
PCB-1248	EPA 608
PCB-1254	EPA 8082A
	EPA 608
PCB-1260	EPA 8082A
	EPA 608
PCB-1262	EPA 8082A
PCB-1268	EPA 8082A
Polynuclear Aromatics	
2-Acetylaminofluorene	EPA 8270D
3-Methylcholanthrene	EPA 8270D
7,12-Dimethylbenzyl (a) anthracene	EPA 8270D
Acenaphthene	EPA 625
	EPA 8270D
Acenaphthylene	EPA 625
	EPA 8270D
Anthracene	EPA 625
	EPA 8270D
Benzo(a)anthracene	EPA 625
	EPA 8270D
Benzo(a)pyrene	EPA 625
	EPA 8270D
Benzo(b)fluoranthene	EPA 625
	EPA 8270D
Benzo(ghi)perylene	EPA 625
	EPA 8270D

Polynuclear Aromatics	
Benzo(k)fluoranthene	EPA 625
	EPA 8270D
Chrysene	EPA 625
	EPA 8270D
Dibenzo(a,h)anthracene	EPA 625
	EPA 8270D
Fluoranthene	EPA 625
	EPA 8270D
Fluorene	EPA 625
	EPA 8270D
Indeno(1,2,3-cd)pyrene	EPA 625
	EPA 8270D
Naphthalene	EPA 625
	EPA 8270D
Phenanthrene	EPA 625
	EPA 8270D
Pyrene	EPA 625
	EPA 8270D
Priority Pollutant Phenols	
2,3,4,6 Tetrachlorophenol	EPA 8270D
2,4,5-Trichlorophenol	EPA 8270D
2,4,6-Trichlorophenol	EPA 625
	EPA 604
	EPA 8270D
2,4-Dichlorophenol	EPA 625

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Priority Pollutant Phenols	
2,4-Dichlorophenol	EPA 604
	EPA 8270D
2,4-Dimethylphenol	EPA 625
	EPA 604
	EPA 8270D
2,4-Dinitrophenol	EPA 625
	EPA 604
	EPA 8270D
2,6-Dichlorophenol	EPA 8270D
2-Chlorophenol	EPA 625
	EPA 604
	EPA 8270D
2-Methyl-4,6-dinitrophenol	EPA 625
	EPA 604
	EPA 8270D
2-Methylphenol	EPA 8270D
2-Nitrophenol	EPA 625
	EPA 604
	EPA 8270D
3-Methylphenol	EPA 8270D
4-Chloro-3-methylphenol	EPA 625
	EPA 604
	EPA 8270D
4-Methylphenol	EPA 8270D
4-Nitrophenol	EPA 625
	EPA 604

Priority Pollutant Phenols	
4-Nitrophenol	EPA 8270D
Cresols, Total	EPA 8270D
Pentachlorophenol	EPA 625
	EPA 604
	EPA 8270D
Phenol	EPA 625
	EPA 604
	EPA 8270D
Residue	
Settleable Solids	SM 2540 F-97,-11
Solids, Total	SM 2540 B-97,-11
Solids, Total Dissolved	SM 2540 C-97,-11
Solids, Total Suspended	SM 2540 D-97,-11
Solids, Volatile	SM 2540 E-97,-11
Semi-Volatile Organics	
1,1'-Biphenyl	EPA 8270D
1,2-Dichlorobenzene, Semi-volatile	EPA 8270D
1,3-Dichlorobenzene, Semi-volatile	EPA 8270D
1,4-Dichlorobenzene, Semi-volatile	EPA 8270D
2-Methylnaphthalene	EPA 8270D
2-Picoline	EPA 8270D
4-Amino biphenyl	EPA 8270D
Acetophenone	EPA 8270D
alpha-Terpineol	EPA 625
Aramite	EPA 8270D

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Semi-Volatile Organics	
Benzaldehyde	EPA 8270D
Benzoic Acid	EPA 8270D
Benzyl alcohol	EPA 8270D
Caprolactam	EPA 8270D
Dibenzofuran	EPA 8270D
Ethyl methanesulfonate	EPA 8270D
Isosafrole	EPA 8270D
Methyl methanesulfonate	EPA 8270D
n-Decane	EPA 625
n-Octadecane	EPA 625
O,O,O-Triethyl phosphorothioate	EPA 8270D
p-Dimethylaminoazobenzene	EPA 8270D
Phenacetin	EPA 8270D
Safrole	EPA 8270D
Volatile Aromatics	
1,2,4-Trichlorobenzene, Volatile	EPA 8260C
1,2,4-Trimethylbenzene	EPA 8260C
1,2-Dichlorobenzene	EPA 8260C
	EPA 601
	EPA 624
	EPA 602
	EPA 524.2
1,3,5-Trimethylbenzene	EPA 8260C
1,3-Dichlorobenzene	EPA 8260C
	EPA 601
Volatile Aromatics	
1,3-Dichlorobenzene	EPA 624
	EPA 602
1,4-Dichlorobenzene	EPA 8260C
	EPA 601
	EPA 624
	EPA 602
2-Chlorotoluene	EPA 8260C
4-Chlorotoluene	EPA 8260C
Benzene	EPA 8260C
	EPA 624
	EPA 602
	EPA 524.2
Bromobenzene	EPA 8260C
Chlorobenzene	EPA 8260C
	EPA 601
	EPA 624
	EPA 602
	EPA 524.2
Ethyl benzene	EPA 8260C
	EPA 624
	EPA 602
Isopropylbenzene	EPA 8260C
m/p-Xylenes	EPA 8260C
	EPA 624
Naphthalene, Volatile	EPA 8260C
n-Butylbenzene	EPA 8260C

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Volatile Aromatics	
n-Propylbenzene	EPA 8260C
o-Xylene	EPA 8260C
	EPA 624
p-Isopropyltoluene (P-Cymene)	EPA 8260C
sec-Butylbenzene	EPA 8260C
Styrene	EPA 8260C
tert-Butylbenzene	EPA 8260C
Toluene	EPA 8260C
	EPA 624
	EPA 602
	EPA 524.2
Total Xylenes	EPA 8260C
	EPA 624
	EPA 602
Volatile Chlorinated Organics	
Benzyl chloride	EPA 8260C
Epichlorohydrin	EPA 8260C
Volatile Halocarbons	
1,1,1,2-Tetrachloroethane	EPA 8260C
1,1,1-Trichloroethane	EPA 8260C
	EPA 601
	EPA 624
1,1,2,2-Tetrachloroethane	EPA 8260C
	EPA 601
	EPA 624

Volatile Halocarbons	
1,1,2-Trichloro-1,2,2-Trifluoroethane	EPA 8260C
1,1,2-Trichloroethane	EPA 8260C
	EPA 601
	EPA 624
1,1-Dichloroethane	EPA 8260C
	EPA 601
	EPA 624
1,1-Dichloroethene	EPA 8260C
	EPA 601
	EPA 624
1,1-Dichloropropene	EPA 8260C
1,2,3-Trichloropropane	EPA 8260C
1,2-Dibromo-3-chloropropane	EPA 8260C
1,2-Dibromoethane	EPA 8260C
1,2-Dichloroethane	EPA 8260C
	EPA 601
	EPA 624
	EPA 524.2
1,2-Dichloropropane	EPA 8260C
	EPA 601
	EPA 624
1,3-Dichloropropane	EPA 8260C
2,2-Dichloropropane	EPA 8260C
2-Chloro-1,3-butadiene (Chloroprene)	EPA 8260C
2-Chloroethylvinyl ether	EPA 8260C
	EPA 601

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Volatile Halocarbons	
2-Chloroethylvinyl ether	EPA 624
3-Chloropropene (Allyl chloride)	EPA 8260C
Bromochloromethane	EPA 8260C
Bromodichloromethane	EPA 8260C
	EPA 601
	EPA 624
Bromoform	EPA 8260C
	EPA 601
	EPA 624
Bromomethane	EPA 8260C
	EPA 601
	EPA 624
Carbon tetrachloride	EPA 8260C
	EPA 601
	EPA 624
Chloroethane	EPA 8260C
	EPA 601
	EPA 624
Chloroform	EPA 8260C
	EPA 601
	EPA 624
	EPA 524.2
Chloromethane	EPA 8260C
	EPA 601
	EPA 624
cis-1,2-Dichloroethene	EPA 8260C

Volatile Halocarbons	
cis-1,2-Dichloroethene	EPA 624
cis-1,3-Dichloropropene	EPA 8260C
	EPA 601
	EPA 624
cis-1,4-Dichloro-2-butene	EPA 8260C
Dibromochloromethane	EPA 8260C
	EPA 601
	EPA 624
Dibromomethane	EPA 8260C
Dichlorodifluoromethane	EPA 8260C
	EPA 601
	EPA 624
Hexachlorobutadiene, Volatile	EPA 8260C
Methyl iodide	EPA 8260C
Methylene chloride	EPA 8260C
	EPA 601
	EPA 624
	EPA 524.2
Tetrachloroethene	EPA 8260C
	EPA 601
	EPA 624
trans-1,2-Dichloroethene	EPA 8260C
	EPA 601
	EPA 624
trans-1,3-Dichloropropene	EPA 8260C
	EPA 601

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Volatile Halocarbons	
trans-1,3-Dichloropropene	EPA 624
trans-1,4-Dichloro-2-butene	EPA 8260C
Trichloroethene	EPA 8260C
	EPA 601
	EPA 624
Trichlorofluoromethane	EPA 8260C
	EPA 601
	EPA 624
Vinyl chloride	EPA 8260C
	EPA 601
	EPA 624
Volatiles Organics	
1,4-Dioxane	EPA 8260C
2-Butanone (Methylethyl ketone)	EPA 8260C
2-Hexanone	EPA 8260C
2-Nitropropane	EPA 8260C
4-Methyl-2-Pentanone	EPA 8260C
	EPA 524.2
Acetone	EPA 8260C
	EPA 524.2
Acetonitrile	EPA 8260C
Carbon Disulfide	EPA 8260C
Cyclohexane	EPA 8260C
Di-ethyl ether	EPA 8260C
Diethylamine	EPA 1671

Volatiles Organics	
Ethylene Glycol	EPA 8015D
Ethylene thiourea	EPA 509 (1995)
Isobutyl alcohol	EPA 8260C
Isopropanol	EPA 8260C
Methanol	EPA 1671
	EPA 8015D
Methyl acetate	EPA 8260C
	EPA 8015D
Methyl cellosolve (2-Methoxyethanol)	EPA 1671
Methyl cyclohexane	EPA 8260C
n-Butanol	EPA 8260C
o-Toluidine	EPA 8260C
	EPA 8270D
Tetrahydrofuran	EPA 524.2
Triethylamine	EPA 1671
Vinyl acetate	EPA 8260C
Sample Preparation Methods	
	SM 4500-P B(5)-99,-11
	EPA 5030C
	EPA 4.1.3
	EPA 9030B
	EPA 3010A
	EPA 3005A
	EPA 3510C
	EPA 3020A

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All approved analytes are listed below:

Sample Preparation Methods

EPA 3535A

SM 4500-F B-97,-11

SM 4500-N Org B or C-97,-11

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Disinfection By-products	
Bromochloroacetic acid	EPA 552.2
Dibromoacetic acid	EPA 552.2
Dichloroacetic acid	EPA 552.2
Monobromoacetic acid	EPA 552.2
Monochloroacetic acid	EPA 552.2
Trichloroacetic acid	EPA 552.2
Fuel Additives	
Methyl tert-butyl ether	EPA 524.2
Metals I	
Arsenic, Total	EPA 200.9 Rev. 2.2
	EPA 200.8 Rev. 5.4
Barium, Total	EPA 200.7 Rev. 4.4
Cadmium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Chromium, Total	EPA 200.7 Rev. 4.4
Copper, Total	EPA 200.7 Rev. 4.4
Iron, Total	EPA 200.7 Rev. 4.4
Lead, Total	EPA 200.9 Rev. 2.2
	EPA 200.8 Rev. 5.4
Manganese, Total	EPA 200.7 Rev. 4.4
Mercury, Total	EPA 245.1 Rev. 3.0
Selenium, Total	EPA 200.9 Rev. 2.2
	EPA 200.8 Rev. 5.4
Silver, Total	EPA 200.7 Rev. 4.4
Zinc, Total	EPA 200.7 Rev. 4.4

Metals II	
Aluminum, Total	EPA 200.7 Rev. 4.4
Antimony, Total	EPA 200.9 Rev. 2.2
	EPA 200.8 Rev. 5.4
Beryllium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Nickel, Total	EPA 200.7 Rev. 4.4
Thallium, Total	EPA 200.9 Rev. 2.2
	EPA 200.8 Rev. 5.4
Metals III	
Calcium, Total	EPA 200.7 Rev. 4.4
Magnesium, Total	EPA 200.7 Rev. 4.4
Potassium, Total	EPA 200.7 Rev. 4.4
Sodium, Total	EPA 200.7 Rev. 4.4
Microextractibles	
1,2-Dibromo-3-chloropropane	EPA 504.1
1,2-Dibromoethane	EPA 504.1
Miscellaneous	
Asbestos	EPA 100.1
Organic Carbon, Dissolved	SM 21-22 5310C (-00)
Organic Carbon, Total	SM 21-22 5310C (-00)
Total Glycol	NYSDOH APC 44
Turbidity	EPA 180.1 Rev. 2.0
UV 254	SM 19-22 5910B (-00)

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All approved analytes are listed below:

Non-Metals	
Alkalinity	SM 18-22 2320B (-97)
Calcium Hardness	EPA 200.7 Rev. 4.4
Chloride	EPA 300.0 Rev. 2.1
Color	SM 18-22 2120B (-01)
Corrosivity	SM 18-22 2330
Cyanide	EPA 335.4 Rev. 1.0
Fluoride, Total	EPA 300.0 Rev. 2.1
Nitrate (as N)	EPA 300.0 Rev. 2.1
	SM 18-22 4500-NO3 F (-00)
Nitrite (as N)	SM 18-22 4500-NO2 B (-00)
Orthophosphate (as P)	EPA 300.0 Rev. 2.1
Solids, Total Dissolved	SM 18-22 2540C (-97)
Specific Conductance	SM 18-22 2510B (-97)
Sulfate (as SO4)	EPA 300.0 Rev. 2.1
Organohalide Pesticides	
Aldrin	EPA 508
Chlordane Total	EPA 508
Dieldrin	EPA 508
Endrin	EPA 508
Heptachlor	EPA 508
Heptachlor epoxide	EPA 508
Lindane	EPA 508
Methoxychlor	EPA 508
Propachlor	EPA 508
Toxaphene	EPA 508
Polychlorinated Biphenyls	
PCB Screen	EPA 508
Trihalomethanes	
Bromodichloromethane	EPA 524.2
Bromoform	EPA 524.2
Chloroform	EPA 524.2
Dibromochloromethane	EPA 524.2
Volatile Aromatics	
1,2,3-Trichlorobenzene	EPA 524.2
1,2,4-Trichlorobenzene	EPA 524.2
1,2,4-Trimethylbenzene	EPA 524.2
1,2-Dichlorobenzene	EPA 524.2
1,3,5-Trimethylbenzene	EPA 524.2
1,3-Dichlorobenzene	EPA 524.2
1,4-Dichlorobenzene	EPA 524.2
2-Chlorotoluene	EPA 524.2
4-Chlorotoluene	EPA 524.2
Benzene	EPA 524.2
Bromobenzene	EPA 524.2
Chlorobenzene	EPA 524.2
Ethyl benzene	EPA 524.2
Hexachlorobutadiene	EPA 524.2
Isopropylbenzene	EPA 524.2
n-Butylbenzene	EPA 524.2
n-Propylbenzene	EPA 524.2
p-Isopropyltoluene (P-Cymene)	EPA 524.2

Serial No.: 55732

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2018
Issued April 01, 2017

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. PAUL BATISTA
ADIRONDACK ENVIRONMENTAL SERVICES INC
314 NORTH PEARL STREET
ALBANY, NY 12207

NY Lab Id No: 10709

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Volatile Aromatics	
sec-Butylbenzene	EPA 524.2
Styrene	EPA 524.2
tert-Butylbenzene	EPA 524.2
Toluene	EPA 524.2
Total Xylenes	EPA 524.2
Volatile Halocarbons	
1,1,1,2-Tetrachloroethane	EPA 524.2
1,1,1-Trichloroethane	EPA 524.2
1,1,2,2-Tetrachloroethane	EPA 524.2
1,1,2-Trichloroethane	EPA 524.2
1,1-Dichloroethane	EPA 524.2
1,1-Dichloroethene	EPA 524.2
1,1-Dichloropropene	EPA 524.2
1,2,3-Trichloropropane	EPA 524.2
1,2-Dichloroethane	EPA 524.2
1,2-Dichloropropane	EPA 524.2
1,3-Dichloropropane	EPA 524.2
2,2-Dichloropropane	EPA 524.2
Bromochloromethane	EPA 524.2
Bromomethane	EPA 524.2
Carbon tetrachloride	EPA 524.2
Chloroethane	EPA 524.2
Chloromethane	EPA 524.2
cis-1,2-Dichloroethene	EPA 524.2
cis-1,3-Dichloropropene	EPA 524.2

Volatile Halocarbons	
Dibromomethane	EPA 524.2
Dichlorodifluoromethane	EPA 524.2
Methylene chloride	EPA 524.2
Tetrachloroethene	EPA 524.2
trans-1,2-Dichloroethene	EPA 524.2
trans-1,3-Dichloropropene	EPA 524.2
Trichloroethene	EPA 524.2
Trichlorofluoromethane	EPA 524.2
Vinyl chloride	EPA 524.2

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All approved analytes are listed below:

Acrylates

Acrolein (Propenal)	EPA 8260C
Acrylonitrile	EPA 8260C

Amines

2-Chloroaniline	EPA 8270D
2-Nitroaniline	EPA 8270D
3-Nitroaniline	EPA 8270D
4-Chloroaniline	EPA 8270D
4-Nitroaniline	EPA 8270D
Carbazole	EPA 8270D

Benzidines

3,3'-Dichlorobenzidine	EPA 8270D
Benzidine	EPA 8270D

Characteristic Testing

Corrosivity	EPA 9040C
	EPA 9045D
Free Liquids	EPA 9095B
Ignitability	EPA 1030
	EPA 1010A
Synthetic Precipitation Leaching Proc.	EPA 1312
TCLP	EPA 1311

Chlorinated Hydrocarbon Pesticides

4,4'-DDD	EPA 8081B
4,4'-DDE	EPA 8081B
4,4'-DDT	EPA 8081B

Chlorinated Hydrocarbon Pesticides

Aldrin	EPA 8081B
alpha-BHC	EPA 8081B
alpha-Chlordane	EPA 8081B
beta-BHC	EPA 8081B
Chlordane Total	EPA 8081B
delta-BHC	EPA 8081B
Dieldrin	EPA 8081B
Endosulfan I	EPA 8081B
Endosulfan II	EPA 8081B
Endosulfan sulfate	EPA 8081B
Endrin	EPA 8081B
Endrin aldehyde	EPA 8081B
Endrin Ketone	EPA 8081B
gamma-Chlordane	EPA 8081B
Heptachlor	EPA 8081B
Heptachlor epoxide	EPA 8081B
Lindane	EPA 8081B
Methoxychlor	EPA 8081B
Mirex	EPA 8081B
Toxaphene	EPA 8081B

Chlorinated Hydrocarbons

1,2,3-Trichlorobenzene	EPA 8260C
1,2,4,5-Tetrachlorobenzene	EPA 8270D
1,2,4-Trichlorobenzene	EPA 8270D
1-Chloronaphthalene	EPA 8270D

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All approved analytes are listed below:

Chlorinated Hydrocarbons	
2-Chloronaphthalene	EPA 8270D
Hexachlorobenzene	EPA 8270D
Hexachlorobutadiene	EPA 8270D
Hexachlorocyclopentadiene	EPA 8270D
Hexachloroethane	EPA 8270D
Chlorophenoxy Acid Pesticides	
2,4,5-T	EPA 8321B
2,4,5-TP (Silvex)	EPA 8321B
2,4-D	EPA 8321B
Haloethers	
2,2'-Oxybis(1-chloropropane)	EPA 8270D
4-Bromophenylphenyl ether	EPA 8270D
4-Chlorophenylphenyl ether	EPA 8270D
Bis(2-chloroethoxy)methane	EPA 8270D
Bis(2-chloroethyl)ether	EPA 8270D
Metals I	
Barium, Total	EPA 6010C
Cadmium, Total	EPA 6010C
Calcium, Total	EPA 6010C
Chromium, Total	EPA 6010C
Copper, Total	EPA 6010C
Iron, Total	EPA 6010C
Lead, Total	EPA 6010C
Magnesium, Total	EPA 6010C
Metals I	
Manganese, Total	EPA 6010C
Nickel, Total	EPA 6010C
Potassium, Total	EPA 6010C
Silver, Total	EPA 6010C
Sodium, Total	EPA 6010C
Strontium, Total	EPA 6010C
Metals II	
Aluminum, Total	EPA 6010C
Antimony, Total	EPA 6010C
Arsenic, Total	EPA 6010C
Beryllium, Total	EPA 6010C
Chromium VI	EPA 7196A
Mercury, Total	EPA 7471B
Selenium, Total	EPA 6010C
Vanadium, Total	EPA 6010C
Zinc, Total	EPA 6010C
Metals III	
Cobalt, Total	EPA 6010C
Molybdenum, Total	EPA 6010C
Thallium, Total	EPA 6010C
Tin, Total	EPA 6010C
Titanium, Total	EPA 6010C
Minerals	
Bromide	EPA 9056A

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Minerals	
Chloride	EPA 9056A
Fluoride, Total	EPA 9056A
Sulfate (as SO4)	EPA 9056A
Miscellaneous	
Boron, Total	EPA 6010C
Cyanide, Total	EPA 9012B
Organic Carbon, Total	Lloyd Kahn Method
Nitroaromatics and Isophorone	
2,4-Dinitrotoluene	EPA 8270D
2,6-Dinitrotoluene	EPA 8270D
Isophorone	EPA 8270D
Pyridine	EPA 8270D
Nitrosoamines	
N-Nitrosodimethylamine	EPA 8270D
N-Nitrosodi-n-propylamine	EPA 8270D
N-Nitrosodiphenylamine	EPA 8270D
N-nitrosomorpholine	EPA 8270D
Nutrients	
Nitrate (as N)	EPA 9056A
Nitrite (as N)	EPA 9056A
Orthophosphate (as P)	EPA 9056A
Organophosphate Pesticides	
Azinphos methyl	EPA 8141B
Organophosphate Pesticides	
Diazinon	EPA 8141B
Disulfoton	EPA 8141B
Famphur	EPA 8141B
Malathion	EPA 8141B
Parathion ethyl	EPA 8141B
Parathion methyl	EPA 8141B
Phorate	EPA 8141B
Sulfotepp	EPA 8141B
TEPP	EPA 8141B
Thionazin	EPA 8141B
Petroleum Hydrocarbons	
Diesel Range Organics	EPA 8015D
Gasoline Range Organics	EPA 8015D
Phthalate Esters	
Benzyl butyl phthalate	EPA 8270D
Bis(2-ethylhexyl) phthalate	EPA 8270D
Diethyl phthalate	EPA 8270D
Dimethyl phthalate	EPA 8270D
Di-n-butyl phthalate	EPA 8270D
Di-n-octyl phthalate	EPA 8270D
Polychlorinated Biphenyls	
PCB-1016	EPA 8082A
PCB-1221	EPA 8082A
PCB-1232	EPA 8082A

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Polychlorinated Biphenyls	
PCB-1242	EPA 8082A
PCB-1248	EPA 8082A
PCB-1254	EPA 8082A
PCB-1260	EPA 8082A
PCB-1262	EPA 8082A
PCB-1268	EPA 8082A
PCBs in Oil	EPA 8082A
Polynuclear Aromatic Hydrocarbons	
Acenaphthene	EPA 8270D
Acenaphthylene	EPA 8270D
Anthracene	EPA 8270D
Benzo(a)anthracene	EPA 8270D
Benzo(a)pyrene	EPA 8270D
Benzo(b)fluoranthene	EPA 8270D
Benzo(ghi)perylene	EPA 8270D
Benzo(k)fluoranthene	EPA 8270D
Chrysene	EPA 8270D
Dibenzo(a,h)anthracene	EPA 8270D
Fluoranthene	EPA 8270D
Fluorene	EPA 8270D
Indeno(1,2,3-cd)pyrene	EPA 8270D
Naphthalene	EPA 8270D
Phenanthrene	EPA 8270D
Pyrene	EPA 8270D

Priority Pollutant Phenols	
2,4,5-Trichlorophenol	EPA 8270D
2,4,6-Trichlorophenol	EPA 8270D
2,4-Dichlorophenol	EPA 8270D
2,4-Dimethylphenol	EPA 8270D
2,4-Dinitrophenol	EPA 8270D
2,6-Dichlorophenol	EPA 8270D
2-Chlorophenol	EPA 8270D
2-Methyl-4,6-dinitrophenol	EPA 8270D
2-Methylphenol	EPA 8270D
2-Nitrophenol	EPA 8270D
3-Methylphenol	EPA 8270D
4-Chloro-3-methylphenol	EPA 8270D
4-Methylphenol	EPA 8270D
4-Nitrophenol	EPA 8270D
Pentachlorophenol	EPA 8270D
Phenol	EPA 8270D
Semi-Volatile Organics	
1,1'-Biphenyl	EPA 8270D
1,2-Dichlorobenzene, Semi-volatile	EPA 8270D
1,3-Dichlorobenzene, Semi-volatile	EPA 8270D
1,4-Dichlorobenzene, Semi-volatile	EPA 8270D
2-Methylnaphthalene	EPA 8270D
Acetophenone	EPA 8270D
Benzaldehyde	EPA 8270D
Benzoic Acid	EPA 8270D

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All approved analytes are listed below:

Semi-Volatile Organics	
Benzyl alcohol	EPA 8270D
Caprolactam	EPA 8270D
Dibenzofuran	EPA 8270D
Volatile Aromatics	
1,2,4-Trichlorobenzene, Volatile	EPA 8260C
1,2,4-Trimethylbenzene	EPA 8260C
1,2-Dichlorobenzene	EPA 8260C
1,3,5-Trimethylbenzene	EPA 8260C
1,3-Dichlorobenzene	EPA 8260C
1,4-Dichlorobenzene	EPA 8260C
2-Chlorotoluene	EPA 8260C
4-Chlorotoluene	EPA 8260C
Benzene	EPA 8260C
Bromobenzene	EPA 8260C
Chlorobenzene	EPA 8260C
Ethyl benzene	EPA 8260C
Isopropylbenzene	EPA 8260C
m/p-Xylenes	EPA 8260C
Naphthalene, Volatile	EPA 8260C
n-Butylbenzene	EPA 8260C
n-Propylbenzene	EPA 8260C
o-Xylene	EPA 8260C
p-Isopropyltoluene (P-Cymene)	EPA 8260C
sec-Butylbenzene	EPA 8260C
Styrene	EPA 8260C
Volatile Aromatics	
tert-Butylbenzene	EPA 8260C
Toluene	EPA 8260C
Total Xylenes	EPA 8260C
Volatile Halocarbons	
1,1,1,2-Tetrachloroethane	EPA 8260C
1,1,1-Trichloroethane	EPA 8260C
1,1,2,2-Tetrachloroethane	EPA 8260C
1,1,2-Trichloro-1,2,2-Trifluoroethane	EPA 8260C
1,1,2-Trichloroethane	EPA 8260C
1,1-Dichloroethane	EPA 8260C
1,1-Dichloroethene	EPA 8260C
1,1-Dichloropropene	EPA 8260C
1,2,3-Trichloropropane	EPA 8260C
1,2-Dibromo-3-chloropropane	EPA 8260C
1,2-Dibromoethane	EPA 8260C
1,2-Dichloroethane	EPA 8260C
1,2-Dichloropropane	EPA 8260C
1,3-Dichloropropane	EPA 8260C
2,2-Dichloropropane	EPA 8260C
2-Chloroethylvinyl ether	EPA 8260C
Bromochloromethane	EPA 8260C
Bromodichloromethane	EPA 8260C
Bromoform	EPA 8260C
Bromomethane	EPA 8260C
Carbon tetrachloride	EPA 8260C

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All approved analytes are listed below:

Volatile Halocarbons

Chloroethane	EPA 8260C
Chloroform	EPA 8260C
Chloromethane	EPA 8260C
cis-1,2-Dichloroethene	EPA 8260C
cis-1,3-Dichloropropene	EPA 8260C
Dibromochloromethane	EPA 8260C
Dibromomethane	EPA 8260C
Dichlorodifluoromethane	EPA 8260C
Hexachlorobutadiene, Volatile	EPA 8260C
Methylene chloride	EPA 8260C
Tetrachloroethene	EPA 8260C
trans-1,2-Dichloroethene	EPA 8260C
trans-1,3-Dichloropropene	EPA 8260C
Trichloroethene	EPA 8260C
Trichlorofluoromethane	EPA 8260C
Vinyl chloride	EPA 8260C

Volatile Organics

1,4-Dioxane	EPA 8260C
2-Butanone (Methylethyl ketone)	EPA 8260C
2-Hexanone	EPA 8260C
4-Methyl-2-Pentanone	EPA 8260C
Acetone	EPA 8260C
Acetonitrile	EPA 8260C
Carbon Disulfide	EPA 8260C
Cyclohexane	EPA 8260C

Volatile Organics

Di-ethyl ether	EPA 8260C
Ethylene Glycol	EPA 8015D
Methyl acetate	EPA 8260C
Methyl cyclohexane	EPA 8260C
Methyl tert-butyl ether	EPA 8260C
Vinyl acetate	EPA 8260C

Sample Preparation Methods

EPA 5035A-L
EPA 5035A-H
EPA 3580A
EPA 9030B
EPA 3010A
EPA 3005A
EPA 3050B
EPA 3020A
EPA 3545A
EPA 3585
EPA 3031
EPA 3060A

Serial No.: 55734

NEW YORK STATE OF OPPORTUNITY. | Department of Health

ANDREW M. CUOMO
Governor

HOWARD A. ZUCKER, M.D., J.D.
Commissioner

SALLY DRESLIN, M.S., R.N.
Executive Deputy Commissioner

LAB ID: 10781

April 01, 2017

MS. ROBYN WAGNER
TESTAMERICA INC. - KNOXVILLE
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN 37921-5947

Certificate Expiration Date:
April 01, 2018

Dear Ms. Wagner,

Enclosed are certificate(s) of approval issued to your environmental laboratory for the current permit year. The certificate(s) supersede(s) any previously issued one(s) and is(are) in effect through the expiration date listed. Please carefully examine the certificate(s) to insure that the categories, subcategories, analytes, and methods for which your laboratory is approved are correct. In addition, verify that your laboratory's name, address, lead technical director, and identification number are accurate.

Pursuant to NYCRR Subpart 55-2.2, original certificates must be posted conspicuously in the laboratory and copies shall be made available to any client of the laboratory upon request.

Pursuant to NYCRR Subpart 55-2.6, any misrepresentation of the fields of accreditation (category - method - analyte) for which your laboratory is approved may result in denial, suspension, or revocation of your certification. Any use of the Environmental Laboratory Approval Program (ELAP) or National Environmental Laboratory Accreditation Program (NELAP) name, reference to the laboratory's approval status, and/or using the NELAP logo in any catalogs, advertising, business solicitations, proposals, quotations, laboratory analytical reports, or other materials must include the laboratory's ELAP identification number and distinguish between testing for which the laboratory is approved and testing for which the laboratory is not approved.

If you have any questions, please contact ELAP at the New York State Department of Health (NYS DOH), Wadsworth Center, PO Box 509, Albany NY, 12201-0509, by phone at (518) 485-5570, by facsimile at (518) 485-5568, and by email at elap@health.ny.gov.

Sincerely,

Victoria Pretti

Victoria Pretti
Director and QA Officer
Environmental Laboratory Approval Program

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

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MS. ROBYN WAGNER
TESTAMERICA INC. - KNOXVILLE
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN 37921-5947

NY Lab Id No: 10781

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Miscellaneous

2,3,7,8-Tetrachlorodibenzo-p-dioxin	EPA 1613B

Serial No.: 55772

NEW YORK STATE DEPARTMENT OF HEALTH
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KNOXVILLE, TN 37921-5947

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All approved analytes are listed below:

Amines	
2-Nitroaniline	EPA 8270D
3-Nitroaniline	EPA 8270D
4-Chloroaniline	EPA 8270D
4-Nitroaniline	EPA 8270D
Aniline	EPA 8270D
Carbazole	EPA 8270D
Pyridine	EPA 8270D
Benzidines	
3,3'-Dichlorobenzidine	EPA 8270D
Benzidine	EPA 8270D
Chlorinated Hydrocarbons	
1,2,4-Trichlorobenzene	EPA 8270D
2-Chloronaphthalene	EPA 8270D
Hexachlorobenzene	EPA 8270D
Hexachlorobutadiene	EPA 8270D
Hexachlorocyclopentadiene	EPA 8270D
Hexachloroethane	EPA 8270D
Dioxins and Furans	
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	EPA 8290A
	EPA 1613B
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-diox	EPA 8290A
	EPA 1613B
1,2,3,4,6,7,8-Heptachlorodibenzofuran	EPA 8290A
	EPA 1613B

Dioxins and Furans	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxi	EPA 8290A
	EPA 1613B
1,2,3,4,7,8,9-Heptachlorodibenzofuran	EPA 8290A
	EPA 1613B
1,2,3,4,7,8-Hexachlorodibenzofuran	EPA 8290A
	EPA 1613B
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	EPA 8290A
	EPA 1613B
1,2,3,6,7,8-Hexachlorodibenzofuran	EPA 8290A
	EPA 1613B
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	EPA 8290A
	EPA 1613B
1,2,3,7,8,9-Hexachlorodibenzofuran	EPA 8290A
	EPA 1613B
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	EPA 8290A
	EPA 1613B
1,2,3,7,8-Pentachlorodibenzofuran	EPA 8290A
	EPA 1613B
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	EPA 8290A
	EPA 1613B
2,3,4,6,7,8-Hexachlorodibenzofuran	EPA 8290A
	EPA 1613B
2,3,4,7,8-Pentachlorodibenzofuran	EPA 8290A
	EPA 1613B
2,3,7,8-Tetrachlorodibenzofuran	EPA 8290A
	EPA 1613B

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NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

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CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MS. ROBYN WAGNER
TESTAMERICA INC. - KNOXVILLE
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN 37921-5947

NY Lab Id No: 10781

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Dioxins and Furans	
2,3,7,8-Tetrachlorodibenzo-p-dioxin	EPA 8290A
	EPA 1613B
Haloethers	
2,2'-Oxybis(1-chloropropane)	EPA 8270D
4-Bromophenylphenyl ether	EPA 8270D
4-Chlorophenylphenyl ether	EPA 8270D
Bis(2-chloroethoxy)methane	EPA 8270D
Bis(2-chloroethyl)ether	EPA 8270D
Nitroaromatics and Isophorone	
2,4-Dinitrotoluene	EPA 8270D
2,6-Dinitrotoluene	EPA 8270D
Isophorone	EPA 8270D
Nitrobenzene	EPA 8270D
Nitrosoamines	
N-Nitrosodimethylamine	EPA 8270D
N-Nitrosodi-n-propylamine	EPA 8270D
N-Nitrosodiphenylamine	EPA 8270D
Phthalate Esters	
Benzyl butyl phthalate	EPA 8270D
Bis(2-ethylhexyl) phthalate	EPA 8270D
Diethyl phthalate	EPA 8270D
Dimethyl phthalate	EPA 8270D
Di-n-butyl phthalate	EPA 8270D
Di-n-octyl phthalate	EPA 8270D

Polychlorinated Biphenyls	
PCB 1	EPA 1668 A
PCB 10	EPA 1668 A
PCB 100	EPA 1668 A
PCB 101	EPA 1668 A
PCB 102	EPA 1668 A
PCB 103	EPA 1668 A
PCB 104	EPA 1668 A
PCB 105	EPA 1668 A
PCB 106	EPA 1668 A
PCB 107	EPA 1668 A
PCB 108	EPA 1668 A
PCB 109	EPA 1668 A
PCB 11	EPA 1668 A
PCB 110	EPA 1668 A
PCB 111	EPA 1668 A
PCB 112	EPA 1668 A
PCB 113	EPA 1668 A
PCB 114	EPA 1668 A
PCB 115	EPA 1668 A
PCB 116	EPA 1668 A
PCB 117	EPA 1668 A
PCB 118	EPA 1668 A
PCB 119	EPA 1668 A
PCB 12	EPA 1668 A
PCB 120	EPA 1668 A
PCB 121	EPA 1668 A

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Polychlorinated Biphenyls		Polychlorinated Biphenyls	
PCB 122	EPA 1668 A	PCB 146	EPA 1668 A
PCB 123	EPA 1668 A	PCB 147	EPA 1668 A
PCB 124	EPA 1668 A	PCB 148	EPA 1668 A
PCB 125	EPA 1668 A	PCB 149	EPA 1668 A
PCB 126	EPA 1668 A	PCB 15	EPA 1668 A
PCB 127	EPA 1668 A	PCB 150	EPA 1668 A
PCB 128	EPA 1668 A	PCB 151	EPA 1668 A
PCB 129	EPA 1668 A	PCB 152	EPA 1668 A
PCB 13	EPA 1668 A	PCB 153	EPA 1668 A
PCB 130	EPA 1668 A	PCB 154	EPA 1668 A
PCB 131	EPA 1668 A	PCB 155	EPA 1668 A
PCB 132	EPA 1668 A	PCB 156	EPA 1668 A
PCB 133	EPA 1668 A	PCB 157	EPA 1668 A
PCB 134	EPA 1668 A	PCB 158	EPA 1668 A
PCB 135	EPA 1668 A	PCB 159	EPA 1668 A
PCB 136	EPA 1668 A	PCB 16	EPA 1668 A
PCB 137	EPA 1668 A	PCB 160	EPA 1668 A
PCB 138	EPA 1668 A	PCB 161	EPA 1668 A
PCB 139	EPA 1668 A	PCB 162	EPA 1668 A
PCB 14	EPA 1668 A	PCB 163	EPA 1668 A
PCB 140	EPA 1668 A	PCB 164	EPA 1668 A
PCB 141	EPA 1668 A	PCB 165	EPA 1668 A
PCB 142	EPA 1668 A	PCB 166	EPA 1668 A
PCB 143	EPA 1668 A	PCB 167	EPA 1668 A
PCB 144	EPA 1668 A	PCB 168	EPA 1668 A
PCB 145	EPA 1668 A	PCB 169	EPA 1668 A

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Polychlorinated Biphenyls		Polychlorinated Biphenyls	
PCB 17	EPA 1668 A	PCB 193	EPA 1668 A
PCB 170	EPA 1668 A	PCB 194	EPA 1668 A
PCB 171	EPA 1668 A	PCB 195	EPA 1668 A
PCB 172	EPA 1668 A	PCB 196	EPA 1668 A
PCB 173	EPA 1668 A	PCB 197	EPA 1668 A
PCB 174	EPA 1668 A	PCB 198	EPA 1668 A
PCB 175	EPA 1668 A	PCB 199	EPA 1668 A
PCB 176	EPA 1668 A	PCB 2	EPA 1668 A
PCB 177	EPA 1668 A	PCB 20	EPA 1668 A
PCB 178	EPA 1668 A	PCB 200	EPA 1668 A
PCB 179	EPA 1668 A	PCB 201	EPA 1668 A
PCB 18	EPA 1668 A	PCB 202	EPA 1668 A
PCB 180	EPA 1668 A	PCB 203	EPA 1668 A
PCB 181	EPA 1668 A	PCB 204	EPA 1668 A
PCB 182	EPA 1668 A	PCB 205	EPA 1668 A
PCB 183	EPA 1668 A	PCB 206	EPA 1668 A
PCB 184	EPA 1668 A	PCB 207	EPA 1668 A
PCB 185	EPA 1668 A	PCB 208	EPA 1668 A
PCB 186	EPA 1668 A	PCB 209	EPA 1668 A
PCB 187	EPA 1668 A	PCB 21	EPA 1668 A
PCB 188	EPA 1668 A	PCB 22	EPA 1668 A
PCB 189	EPA 1668 A	PCB 23	EPA 1668 A
PCB 19	EPA 1668 A	PCB 24	EPA 1668 A
PCB 190	EPA 1668 A	PCB 25	EPA 1668 A
PCB 191	EPA 1668 A	PCB 26	EPA 1668 A
PCB 192	EPA 1668 A	PCB 27	EPA 1668 A

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Polychlorinated Biphenyls		Polychlorinated Biphenyls	
PCB 28	EPA 1668 A	PCB 51	EPA 1668 A
PCB 29	EPA 1668 A	PCB 52	EPA 1668 A
PCB 3	EPA 1668 A	PCB 53	EPA 1668 A
PCB 30	EPA 1668 A	PCB 54	EPA 1668 A
PCB 31	EPA 1668 A	PCB 55	EPA 1668 A
PCB 32	EPA 1668 A	PCB 56	EPA 1668 A
PCB 33	EPA 1668 A	PCB 57	EPA 1668 A
PCB 34	EPA 1668 A	PCB 58	EPA 1668 A
PCB 35	EPA 1668 A	PCB 59	EPA 1668 A
PCB 36	EPA 1668 A	PCB 6	EPA 1668 A
PCB 37	EPA 1668 A	PCB 60	EPA 1668 A
PCB 38	EPA 1668 A	PCB 61	EPA 1668 A
PCB 39	EPA 1668 A	PCB 62	EPA 1668 A
PCB 4	EPA 1668 A	PCB 63	EPA 1668 A
PCB 40	EPA 1668 A	PCB 64	EPA 1668 A
PCB 41	EPA 1668 A	PCB 65	EPA 1668 A
PCB 42	EPA 1668 A	PCB 66	EPA 1668 A
PCB 43	EPA 1668 A	PCB 67	EPA 1668 A
PCB 44	EPA 1668 A	PCB 68	EPA 1668 A
PCB 45	EPA 1668 A	PCB 69	EPA 1668 A
PCB 46	EPA 1668 A	PCB 7	EPA 1668 A
PCB 47	EPA 1668 A	PCB 70	EPA 1668 A
PCB 48	EPA 1668 A	PCB 71	EPA 1668 A
PCB 49	EPA 1668 A	PCB 72	EPA 1668 A
PCB 5	EPA 1668 A	PCB 73	EPA 1668 A
PCB 50	EPA 1668 A	PCB 74	EPA 1668 A

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Polychlorinated Biphenyls	
PCB 75	EPA 1668 A
PCB 76	EPA 1668 A
PCB 77	EPA 1668 A
PCB 78	EPA 1668 A
PCB 79	EPA 1668 A
PCB 8	EPA 1668 A
PCB 80	EPA 1668 A
PCB 81	EPA 1668 A
PCB 82	EPA 1668 A
PCB 83	EPA 1668 A
PCB 84	EPA 1668 A
PCB 85	EPA 1668 A
PCB 86	EPA 1668 A
PCB 87	EPA 1668 A
PCB 88	EPA 1668 A
PCB 89	EPA 1668 A
PCB 9	EPA 1668 A
PCB 90	EPA 1668 A
PCB 91	EPA 1668 A
PCB 92	EPA 1668 A
PCB 93	EPA 1668 A
PCB 94	EPA 1668 A
PCB 95	EPA 1668 A
PCB 96	EPA 1668 A
PCB 97	EPA 1668 A
PCB 98	EPA 1668 A
Polychlorinated Biphenyls	
PCB 99	EPA 1668 A
Polynuclear Aromatics	
Acenaphthene	EPA 8270D
Acenaphthylene	EPA 8270D
Anthracene	EPA 8270D
Benzo(a)anthracene	EPA 8270D
Benzo(a)pyrene	EPA 8270D
Benzo(b)fluoranthene	EPA 8270D
Benzo(ghi)perylene	EPA 8270D
Benzo(k)fluoranthene	EPA 8270D
Chrysene	EPA 8270D
Dibenzo(a,h)anthracene	EPA 8270D
Fluoranthene	EPA 8270D
Fluorene	EPA 8270D
Indeno(1,2,3-cd)pyrene	EPA 8270D
Naphthalene	EPA 8270D
Phenanthrene	EPA 8270D
Pyrene	EPA 8270D
Priority Pollutant Phenols	
2,4,5-Trichlorophenol	EPA 8270D
2,4,6-Trichlorophenol	EPA 8270D
2,4-Dichlorophenol	EPA 8270D
2,4-Dimethylphenol	EPA 8270D
2,4-Dinitrophenol	EPA 8270D
2-Chlorophenol	EPA 8270D

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All approved analytes are listed below:

Priority Pollutant Phenols	
2-Methyl-4,6-dinitrophenol	EPA 8270D
2-Methylphenol	EPA 8270D
2-Nitrophenol	EPA 8270D
4-Chloro-3-methylphenol	EPA 8270D
4-Methylphenol	EPA 8270D
4-Nitrophenol	EPA 8270D
Pentachlorophenol	EPA 8270D
Phenol	EPA 8270D
Semi-Volatile Organics	
1,2-Dichlorobenzene, Semi-volatile	EPA 8270D
1,3-Dichlorobenzene, Semi-volatile	EPA 8270D
1,4-Dichlorobenzene, Semi-volatile	EPA 8270D
Acetophenone	EPA 8270D
Benzoic Acid	EPA 8270D
Benzyl alcohol	EPA 8270D
Dibenzofuran	EPA 8270D
Sample Preparation Methods	
	EPA 3520C

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All approved analytes are listed below:

Amines

1,2-Diphenylhydrazine	EPA 8270D
2-Nitroaniline	EPA 8270D
3-Nitroaniline	EPA 8270D
4-Chloroaniline	EPA 8270D
4-Nitroaniline	EPA 8270D
Aniline	EPA 8270D
Carbazole	EPA 8270D

Benzidines

3,3'-Dichlorobenzidine	EPA 8270D
Benzidine	EPA 8270D

Chlorinated Hydrocarbons

1,2,4-Trichlorobenzene	EPA 8270D
2-Chloronaphthalene	EPA 8270D
Hexachlorobenzene	EPA 8270D
Hexachlorobutadiene	EPA 8270D
Hexachlorocyclopentadiene	EPA 8270D
Hexachloroethane	EPA 8270D

Dioxins and Furans

1,2,3,4,6,7,8,9-Octachlorodibenzofuran	EPA 8290A
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-diox	EPA 8290A
1,2,3,4,6,7,8-Heptachlorodibenzofuran	EPA 8290A
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxi	EPA 8290A
1,2,3,4,7,8,9-Heptachlorodibenzofuran	EPA 8290A
1,2,3,4,7,8-Hexachlorodibenzofuran	EPA 8290A

Dioxins and Furans

1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	EPA 8290A
1,2,3,6,7,8-Hexachlorodibenzofuran	EPA 8290A
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	EPA 8290A
1,2,3,7,8,9-Hexachlorodibenzofuran	EPA 8290A
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	EPA 8290A
1,2,3,7,8-Pentachlorodibenzofuran	EPA 8290A
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	EPA 8290A
2,3,4,6,7,8-Hexachlorodibenzofuran	EPA 8290A
2,3,4,7,8-Pentachlorodibenzofuran	EPA 8290A
2,3,7,8-Tetrachlorodibenzofuran	EPA 8290A
2,3,7,8-Tetrachlorodibenzo-p-dioxin	EPA 8290A

Haloethers

2,2'-Oxybis(1-chloropropane)	EPA 8270D
4-Bromophenylphenyl ether	EPA 8270D
4-Chlorophenylphenyl ether	EPA 8270D
Bis(2-chloroethoxy)methane	EPA 8270D
Bis(2-chloroethyl)ether	EPA 8270D

Nitroaromatics and Isophorone

2,4-Dinitrotoluene	EPA 8270D
2,6-Dinitrotoluene	EPA 8270D
Isophorone	EPA 8270D
Nitrobenzene	EPA 8270D
Pyridine	EPA 8270D

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All approved analytes are listed below:

Nitrosoamines	
N-Nitrosodimethylamine	EPA 8270D
N-Nitrosodi-n-propylamine	EPA 8270D
N-Nitrosodiphenylamine	EPA 8270D
Phthalate Esters	
Benzyl butyl phthalate	EPA 8270D
Bis(2-ethylhexyl) phthalate	EPA 8270D
Diethyl phthalate	EPA 8270D
Dimethyl phthalate	EPA 8270D
Di-n-butyl phthalate	EPA 8270D
Di-n-octyl phthalate	EPA 8270D
Polychlorinated Biphenyls	
PCB 1	EPA 1668 A
PCB 10	EPA 1668 A
PCB 100	EPA 1668 A
PCB 101	EPA 1668 A
PCB 102	EPA 1668 A
PCB 103	EPA 1668 A
PCB 104	EPA 1668 A
PCB 105	EPA 1668 A
PCB 106	EPA 1668 A
PCB 107	EPA 1668 A
PCB 108	EPA 1668 A
PCB 109	EPA 1668 A
PCB 11	EPA 1668 A
PCB 110	EPA 1668 A
Polychlorinated Biphenyls	
PCB 111	EPA 1668 A
PCB 112	EPA 1668 A
PCB 113	EPA 1668 A
PCB 114	EPA 1668 A
PCB 115	EPA 1668 A
PCB 116	EPA 1668 A
PCB 117	EPA 1668 A
PCB 118	EPA 1668 A
PCB 119	EPA 1668 A
PCB 12	EPA 1668 A
PCB 120	EPA 1668 A
PCB 121	EPA 1668 A
PCB 122	EPA 1668 A
PCB 123	EPA 1668 A
PCB 124	EPA 1668 A
PCB 125	EPA 1668 A
PCB 126	EPA 1668 A
PCB 127	EPA 1668 A
PCB 128	EPA 1668 A
PCB 129	EPA 1668 A
PCB 13	EPA 1668 A
PCB 130	EPA 1668 A
PCB 131	EPA 1668 A
PCB 132	EPA 1668 A
PCB 133	EPA 1668 A
PCB 134	EPA 1668 A

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Polychlorinated Biphenyls		Polychlorinated Biphenyls	
PCB 135	EPA 1668 A	PCB 159	EPA 1668 A
PCB 136	EPA 1668 A	PCB 16	EPA 1668 A
PCB 137	EPA 1668 A	PCB 160	EPA 1668 A
PCB 138	EPA 1668 A	PCB 161	EPA 1668 A
PCB 139	EPA 1668 A	PCB 162	EPA 1668 A
PCB 14	EPA 1668 A	PCB 163	EPA 1668 A
PCB 140	EPA 1668 A	PCB 164	EPA 1668 A
PCB 141	EPA 1668 A	PCB 165	EPA 1668 A
PCB 142	EPA 1668 A	PCB 166	EPA 1668 A
PCB 143	EPA 1668 A	PCB 167	EPA 1668 A
PCB 144	EPA 1668 A	PCB 168	EPA 1668 A
PCB 145	EPA 1668 A	PCB 169	EPA 1668 A
PCB 146	EPA 1668 A	PCB 17	EPA 1668 A
PCB 147	EPA 1668 A	PCB 170	EPA 1668 A
PCB 148	EPA 1668 A	PCB 171	EPA 1668 A
PCB 149	EPA 1668 A	PCB 172	EPA 1668 A
PCB 15	EPA 1668 A	PCB 173	EPA 1668 A
PCB 150	EPA 1668 A	PCB 174	EPA 1668 A
PCB 151	EPA 1668 A	PCB 175	EPA 1668 A
PCB 152	EPA 1668 A	PCB 176	EPA 1668 A
PCB 153	EPA 1668 A	PCB 177	EPA 1668 A
PCB 154	EPA 1668 A	PCB 178	EPA 1668 A
PCB 155	EPA 1668 A	PCB 179	EPA 1668 A
PCB 156	EPA 1668 A	PCB 18	EPA 1668 A
PCB 157	EPA 1668 A	PCB 180	EPA 1668 A
PCB 158	EPA 1668 A	PCB 181	EPA 1668 A

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Polychlorinated Biphenyls		Polychlorinated Biphenyls	
PCB 182	EPA 1668 A	PCB 205	EPA 1668 A
PCB 183	EPA 1668 A	PCB 206	EPA 1668 A
PCB 184	EPA 1668 A	PCB 207	EPA 1668 A
PCB 185	EPA 1668 A	PCB 208	EPA 1668 A
PCB 186	EPA 1668 A	PCB 209	EPA 1668 A
PCB 187	EPA 1668 A	PCB 21	EPA 1668 A
PCB 188	EPA 1668 A	PCB 22	EPA 1668 A
PCB 189	EPA 1668 A	PCB 23	EPA 1668 A
PCB 19	EPA 1668 A	PCB 24	EPA 1668 A
PCB 190	EPA 1668 A	PCB 25	EPA 1668 A
PCB 191	EPA 1668 A	PCB 26	EPA 1668 A
PCB 192	EPA 1668 A	PCB 27	EPA 1668 A
PCB 193	EPA 1668 A	PCB 28	EPA 1668 A
PCB 194	EPA 1668 A	PCB 29	EPA 1668 A
PCB 195	EPA 1668 A	PCB 3	EPA 1668 A
PCB 196	EPA 1668 A	PCB 30	EPA 1668 A
PCB 197	EPA 1668 A	PCB 31	EPA 1668 A
PCB 198	EPA 1668 A	PCB 32	EPA 1668 A
PCB 199	EPA 1668 A	PCB 33	EPA 1668 A
PCB 2	EPA 1668 A	PCB 34	EPA 1668 A
PCB 20	EPA 1668 A	PCB 35	EPA 1668 A
PCB 200	EPA 1668 A	PCB 36	EPA 1668 A
PCB 201	EPA 1668 A	PCB 37	EPA 1668 A
PCB 202	EPA 1668 A	PCB 38	EPA 1668 A
PCB 203	EPA 1668 A	PCB 39	EPA 1668 A
PCB 204	EPA 1668 A	PCB 4	EPA 1668 A

Serial No.: 55774

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2018
Issued April 01, 2017

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MS. ROBYN WAGNER
TESTAMERICA INC. - KNOXVILLE
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN 37921-5947

NY Lab Id No: 10781

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Polychlorinated Biphenyls		Polychlorinated Biphenyls	
PCB 40	EPA 1668 A	PCB 64	EPA 1668 A
PCB 41	EPA 1668 A	PCB 65	EPA 1668 A
PCB 42	EPA 1668 A	PCB 66	EPA 1668 A
PCB 43	EPA 1668 A	PCB 67	EPA 1668 A
PCB 44	EPA 1668 A	PCB 68	EPA 1668 A
PCB 45	EPA 1668 A	PCB 69	EPA 1668 A
PCB 46	EPA 1668 A	PCB 7	EPA 1668 A
PCB 47	EPA 1668 A	PCB 70	EPA 1668 A
PCB 48	EPA 1668 A	PCB 71	EPA 1668 A
PCB 49	EPA 1668 A	PCB 72	EPA 1668 A
PCB 5	EPA 1668 A	PCB 73	EPA 1668 A
PCB 50	EPA 1668 A	PCB 74	EPA 1668 A
PCB 51	EPA 1668 A	PCB 75	EPA 1668 A
PCB 52	EPA 1668 A	PCB 76	EPA 1668 A
PCB 53	EPA 1668 A	PCB 77	EPA 1668 A
PCB 54	EPA 1668 A	PCB 78	EPA 1668 A
PCB 55	EPA 1668 A	PCB 79	EPA 1668 A
PCB 56	EPA 1668 A	PCB 8	EPA 1668 A
PCB 57	EPA 1668 A	PCB 80	EPA 1668 A
PCB 58	EPA 1668 A	PCB 81	EPA 1668 A
PCB 59	EPA 1668 A	PCB 82	EPA 1668 A
PCB 6	EPA 1668 A	PCB 83	EPA 1668 A
PCB 60	EPA 1668 A	PCB 84	EPA 1668 A
PCB 61	EPA 1668 A	PCB 85	EPA 1668 A
PCB 62	EPA 1668 A	PCB 86	EPA 1668 A
PCB 63	EPA 1668 A	PCB 87	EPA 1668 A

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All approved analytes are listed below.

Polychlorinated Biphenyls	
PCB 88	EPA 1668 A
PCB 89	EPA 1668 A
PCB 9	EPA 1668 A
PCB 90	EPA 1668 A
PCB 91	EPA 1668 A
PCB 92	EPA 1668 A
PCB 93	EPA 1668 A
PCB 94	EPA 1668 A
PCB 95	EPA 1668 A
PCB 96	EPA 1668 A
PCB 97	EPA 1668 A
PCB 98	EPA 1668 A
PCB 99	EPA 1668 A
Polynuclear Aromatic Hydrocarbons	
Acenaphthene	EPA 8270D
Acenaphthylene	EPA 8270D
Anthracene	EPA 8270D
Benzo(a)anthracene	EPA 8270D
Benzo(a)pyrene	EPA 8270D
Benzo(b)fluoranthene	EPA 8270D
Benzo(ghi)perylene	EPA 8270D
Benzo(k)fluoranthene	EPA 8270D
Chrysene	EPA 8270D
Dibenzo(a,h)anthracene	EPA 8270D
Fluoranthene	EPA 8270D
Polynuclear Aromatic Hydrocarbons	
Fluorene	EPA 8270D
Indeno(1,2,3-cd)pyrene	EPA 8270D
Naphthalene	EPA 8270D
Phenanthrene	EPA 8270D
Pyrene	EPA 8270D
Priority Pollutant Phenols	
2,4,5-Trichlorophenol	EPA 8270D
2,4,6-Trichlorophenol	EPA 8270D
2,4-Dichlorophenol	EPA 8270D
2,4-Dimethylphenol	EPA 8270D
2,4-Dinitrophenol	EPA 8270D
2-Chlorophenol	EPA 8270D
2-Methyl-4,6-dinitrophenol	EPA 8270D
2-Methylphenol	EPA 8270D
2-Nitrophenol	EPA 8270D
4-Chloro-3-methylphenol	EPA 8270D
4-Methylphenol	EPA 8270D
4-Nitrophenol	EPA 8270D
Pentachlorophenol	EPA 8270D
Phenol	EPA 8270D
Semi-Volatile Organics	
1,2-Dichlorobenzene, Semi-volatile	EPA 8270D
1,3-Dichlorobenzene, Semi-volatile	EPA 8270D
1,4-Dichlorobenzene, Semi-volatile	EPA 8270D
2-Methylnaphthalene	EPA 8270D

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All approved analytes are listed below:

Semi-Volatile Organics	
Acetophenone	EPA 8270D
Benzoic Acid	EPA 8270D
Benzyl alcohol	EPA 8270D
Dibenzofuran	EPA 8270D
Sample Preparation Methods	
	EPA 3550C
	EPA 3540C

Serial No.: 55774

Property of the New York State Department of Health. Certificates are valid only at the address shown, must be conspicuously posted, and are printed on secure paper. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify the laboratory's accreditation status.

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All approved analytes are listed below:

Acrylates	
Acetonitrile	EPA TO-15
Acrylonitrile	EPA TO-15
Methyl methacrylate	EPA TO-15
Chlorinated Hydrocarbons	
1,2,4-Trichlorobenzene	EPA TO-14A
	EPA TO-15
Hexachlorobutadiene	EPA TO-14A
	EPA TO-15
Polychlorinated Biphenyls	
PCBs and Aroclors	EPA TO-10A
	EPA TO-4A
Polynuclear Aromatics	
Acenaphthene	EPA TO-13A
Acenaphthylene	EPA TO-13A
Anthracene	EPA TO-13A
Benzo(a)anthracene	EPA TO-13A
Benzo(a)pyrene	EPA TO-13A
Benzo(b)fluoranthene	EPA TO-13A
Benzo(ghi)perylene	EPA TO-13A
Benzo(k)fluoranthene	EPA TO-13A
Chrysene	EPA TO-13A
Dibenzo(a,h)anthracene	EPA TO-13A
Fluoranthene	EPA TO-13A
Fluorene	EPA TO-13A
Polynuclear Aromatics	
Indeno(1,2,3-cd)pyrene	EPA TO-13A
Naphthalene	EPA TO-13A
	EPA TO-15
Phenanthrene	EPA TO-13A
Pyrene	EPA TO-13A
Purgeable Aromatics	
1,2,4-Trimethylbenzene	EPA TO-14A
1,2-Dichlorobenzene	EPA TO-14A
	EPA TO-15
1,3,5-Trimethylbenzene	EPA TO-14A
1,3-Dichlorobenzene	EPA TO-14A
	EPA TO-15
1,4-Dichlorobenzene	EPA TO-14A
	EPA TO-15
2-Chlorotoluene	EPA TO-15
Benzene	EPA TO-14A
	EPA TO-15
Chlorobenzene	EPA TO-14A
	EPA TO-15
Ethyl benzene	EPA TO-14A
	EPA TO-15
Isopropylbenzene	EPA TO-15
m/p-Xylenes	EPA TO-15
Styrene	EPA TO-14A
	EPA TO-15

Serial No.: 55775

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WADSWORTH CENTER

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5815 MIDDLEBROOK PIKE
KNOXVILLE, TN 37921-5947

NY Lab Id No: 10781

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES AIR AND EMISSIONS
All approved analytes are listed below:

Purgeable Aromatics	
Toluene	EPA TO-14A
	EPA TO-15
Total Xylenes	EPA TO-14A
	EPA TO-15
Purgeable Halocarbons	
1,1,1-Trichloroethane	EPA TO-14A
	EPA TO-15
1,1,2,2-Tetrachloroethane	EPA TO-14A
	EPA TO-15
1,1,2-Trichloro-1,2,2-Trifluoroethane	EPA TO-14A
1,1,2-Trichloroethane	EPA TO-14A
	EPA TO-15
1,1-Dichloroethane	EPA TO-14A
	EPA TO-15
1,1-Dichloroethene	EPA TO-14A
	EPA TO-15
1,2-Dibromoethane	EPA TO-14A
	EPA TO-15
1,2-Dichloroethane	EPA TO-14A
	EPA TO-15
1,2-Dichloropropane	EPA TO-14A
	EPA TO-15
3-Chloropropene (Allyl chloride)	EPA TO-15
Bromodichloromethane	EPA TO-15
Bromoform	EPA TO-15

Purgeable Halocarbons	
Bromomethane	EPA TO-14A
	EPA TO-15
Carbon tetrachloride	EPA TO-14A
	EPA TO-15
Chloroethane	EPA TO-14A
	EPA TO-15
Chloroform	EPA TO-14A
	EPA TO-15
Chloromethane	EPA TO-14A
	EPA TO-15
cis-1,2-Dichloroethene	EPA TO-14A
	EPA TO-15
cis-1,3-Dichloropropene	EPA TO-14A
	EPA TO-15
Dibromochloromethane	EPA TO-15
Dichlorodifluoromethane	EPA TO-14A
Methylene chloride	EPA TO-14A
	EPA TO-15
Tetrachloroethene	EPA TO-14A
	EPA TO-15
trans-1,2-Dichloroethene	EPA TO-15
trans-1,3-Dichloropropene	EPA TO-14A
	EPA TO-15
Trichloroethene	EPA TO-14A
	EPA TO-15
Trichlorofluoromethane	EPA TO-14A

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All approved analytes are listed below:

Purgeable Halocarbons	
Vinyl bromide	EPA TO-15
Vinyl chloride	EPA TO-14A
	EPA TO-15
Volatile Chlorinated Organics	
Benzyl chloride	EPA TO-14A
	EPA TO-15
Volatile Organics	
1,2-Dichlorotetrafluoroethane	EPA TO-14A
1,3-Butadiene	EPA TO-15
1,4-Dioxane	EPA TO-15
2,2,4-Trimethylpentane	EPA TO-15
2-Butanone (Methylethyl ketone)	EPA TO-15
4-Methyl-2-Pentanone	EPA TO-15
Acetaldehyde	EPA TO-15
Acetone	EPA TO-15
Acrolein (Propenal)	EPA TO-15
Carbon Disulfide	EPA TO-15
Cyclohexane	EPA TO-15
Hexane	EPA TO-15
Isopropanol	EPA TO-15
Methanol	EPA TO-15
Methyl tert-butyl ether	EPA TO-15
n-Heptane	EPA TO-15
tert-butyl alcohol	EPA TO-15
Vinyl acetate	EPA TO-15

Serial No.: 55775

Rec'd 4/4/17 AJR

NEW YORK STATE OF OPPORTUNITY. | Department of Health

ANDREW M. CUOMO
Governor

HOWARD A. ZUCKER, M.D., J.D.
Commissioner

SALLY DRESLIN, M.S., R.N.
Executive Deputy Commissioner

LAB ID: 10781

April 01, 2017

MS. ROBYN WAGNER
TESTAMERICA INC. - KNOXVILLE
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN 37921-5947

Dear Ms. Wagner,

A revised certificate has been generated because of the change(s) listed below.

If your laboratory has applied for a change in the laboratory's location and/or technical director, the approved change(s) will be reflected on the certificate.

If the changes to your certification are due to insufficient proficiency tests and/or proficiency test failures, the expired certificates must be returned to the Environmental Laboratory Approval Program (ELAP) office within 10 days of the date of this letter. In addition, your laboratory must investigate the root cause for any insufficient and/or unsatisfactory proficiency tests.

In addition, your laboratory must investigate and document the root cause for any insufficient and/or unsatisfactory proficiency tests. If your lab lost accreditation due to two PT failures, you must submit the corrective action response to ELAP for review before accreditation will be re-instated.

AppCat	Analyte Name	Method Name	Comments	Date
AI - NELAC			Lab Name Changed	03/13/2017
NW - NELAC			Lab Name Changed	03/13/2017
PW - NELAC			Lab Name Changed	03/13/2017
SW - NELAC			Lab Name Changed	03/13/2017

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

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CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

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MS. MARTHA MAIER
VISTA ANALYTICAL LABORATORY
1104 WINDFIELD WAY
EL DORADO HILLS, CA 95762

NY Lab Id No: 11411

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Perfluorinated Alkyl Acids

Perfluorooctanesulfonic acid (PFOS)	EPA 537
Perfluorooctanoic acid (PFOA)	EPA 537

Serial No.: 55995

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MS. MARTHA MAIER
VISTA ANALYTICAL LABORATORY
1104 WINDFIELD WAY
EL DORADO HILLS, CA 95762

NY Lab Id No: 11411

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Dioxins and Furans

2,3,7,8-Tetrachlorodibenzofuran	EPA 1613B
2,3,7,8-Tetrachlorodibenzo-p-dioxin	EPA 613
	EPA 8280B
	EPA 1613B

Polychlorinated Biphenyls

PCB 105	EPA 1668 A
PCB 114	EPA 1668 A
PCB 118	EPA 1668 A
PCB 123	EPA 1668 A
PCB 126	EPA 1668 A
PCB 156	EPA 1668 A
PCB 157	EPA 1668 A
PCB 167	EPA 1668 A
PCB 169	EPA 1668 A
PCB 189	EPA 1668 A
PCB 77	EPA 1668 A
PCB 81	EPA 1668 A

Serial No.: 55996

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EL DORADO HILLS, CA 95762

NY Lab Id No: 11411

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Dioxins and Furans	
2,3,7,8-Tetrachlorodibenzofuran	EPA 8290A
2,3,7,8-Tetrachlorodibenzo-p-dioxin	EPA 8290A
Polychlorinated Biphenyls	
PCB 105	EPA 1668 A
PCB 114	EPA 1668 A
PCB 118	EPA 1668 A
PCB 123	EPA 1668 A
PCB 126	EPA 1668 A
PCB 151	EPA 1668 A
PCB 156	EPA 1668 A
PCB 157	EPA 1668 A
PCB 167	EPA 1668 A
PCB 169	EPA 1668 A
PCB 189	EPA 1668 A
PCB 77	EPA 1668 A
PCB 81	EPA 1668 A

Serial No.: 55997